THE
physical therapy REVIEW

Participation of the Abdominal Muscles in
Various Movements of the Trunk in Man:
An Electromyographic Study — PARTRIDGE and WALTERS
Low Back Pain and Sciatica — MOE
Three Case Histories
Low Back Pain — FOWLER
Postoperative Herniated Nucleus Pulposus — KUMPURIS
Recurrent Back Pain: Emotional and Physical
Aspects — SEXTON, LEONARD, and BUCHANAN
Sprains, Strains, and Whiplash Injuries — MARTIN
Three Case Histories
Cervical Strain — MAUL
Whiplash Injury — MORRISSEY
Radiculitis — PASCASIO
Suggestions from the Field — GELLER

Annual Index

Volume 39, Number 12 **December 1959**

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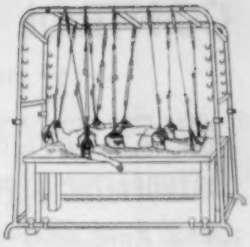

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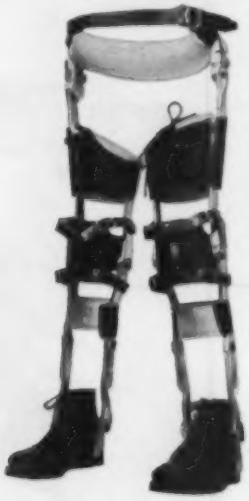

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SPINAL COLUMN—STRUCTURE AND FUNCTION IN MAN—11 min., b/w, sd., 1956, The Pennsylvania State University, Audio Visual Aids Library, University Park, Pa., or Encyclopedia Britannica. Details of movements, structure, and function. Importance of good posture. Rental: $2.25

THE BRAIN AND BEHAVIOR—20 min., b/w, sd., 1958, New York University Film Library, 26 Washington Place, New York 3, N. Y. Results of stimulation by electrode, and behavior changes following injuries to different parts of the brain demonstrate connection between areas and specific types of behavior. Rental: $6.00

DEMONSTRATIONS IN HUMAN LEARNING—15 min., b/w, sd., 1957, The Pennsylvania State University, Audio Visual Aids Library, University Park, Pa. Gives examples of skills involving serial learning. Relate to examples from every-day life. Rental: $3.50

JUVENILE AMPUTEES CAN BE HABILITATED—12 min., b/w, sd., Department of Public Health, State of Georgia, Atlanta, Ga. Follows a quadruple amputee through the various phases of team approach in the habilitation of a juvenile amputee.

RESCUE BREATHING—25 min., b/w, sd., Nearest U.S. Army Film Library. Designed to teach technics of expired air inflation to all ages in groups of all types.

MOUTH TO MOUTH BREATHING—10 min., b/w, sd., U. S. Army Film Library. Filmed at time actual research studies in resuscitation were in progress.

NO MARGIN FOR ERROR—30 min., b/w, sd., 1959, The William S. Merrell Company, Cincinnati 15, Ohio, Free; American Hospital Association, 840 North Lakeshore Drive, Chicago 11, Ill.; American Medical Association, 535 North Dearborn Street, Chicago 10, Ill. Free. Presents cause and effect of human mistakes in the complex system of the modern hospital and points the way for active cooperation between medical and administrative staffs of the hospital.

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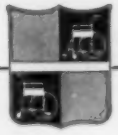

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Vol. 39 No. 12

IN THIS ISSUE

Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographic Study – Miriam J. Partridge and C. Etta Walters, Ph.D. 791

Low Back Pain and Sciatica – John H. Moe, M.D. 800

Three Case Histories

Low Back Pain – Elizabeth Fowler, Major, AMSC 803

Postoperative Herniated Nucleus Pulposus – Mike Kumpuris 804

Recurrent Back Pain: Emotional and Physical Aspects – Margaret L. Sexton, Ronald Leonard, and Josephine J. Buchanan, M.D. 806

Sprains, Strains, and Whiplash Injuries – Gordon M. Martin, M.D. 808

Three Case Histories

Cervical Strain – Robert Maul 814

Whiplash Injury – Leo J. Morrissey 815

Radiculitis – Anne Pascasio 817

Annual Index 846

Regular Features

Suggestions from the Field

A Teaching Device for the Ataxic Child—Alex Geller 818

Association Officers, Standing and Advisory Committees 819

World Confederation for Physical Therapy 821

Association News 827

Education 833

Short Term Courses 832

Schools Offering Courses in Physical Therapy 834

Abstracts 836

Book Reviews 840

Book Reviewers for December 843

What's New 845

Index to Current Literature 786

State Board Examinations–1959 788

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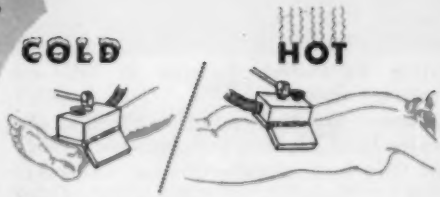

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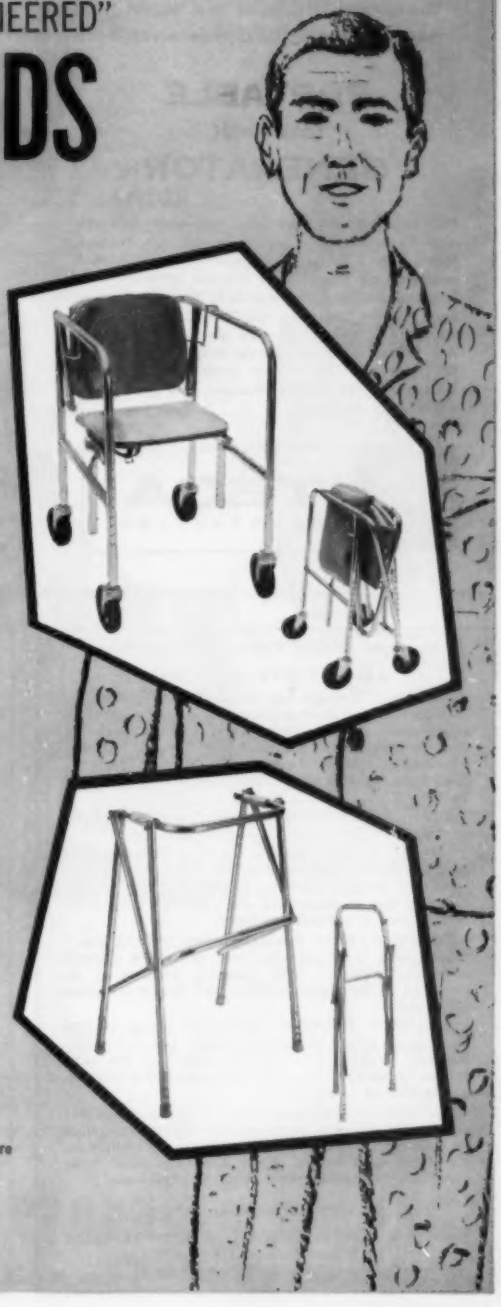

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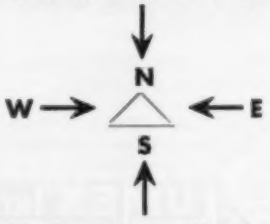

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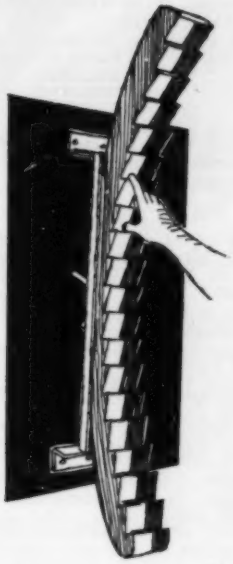

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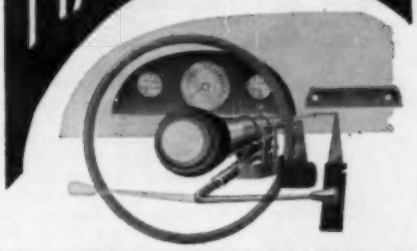

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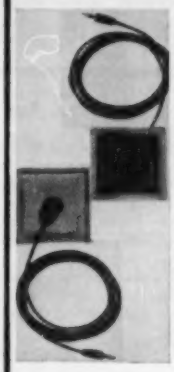

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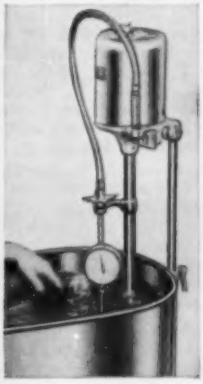

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Arkansas*: Apply to Joe Verser, M.D., Sec., Board of Physical Therapy Examiners, Harrisburg.

California*†: Apply to State Board of Medical Examiners, 1020 N St., Room 530, Sacramento 14. Examinations held in Los Angeles and San Francisco. SPECIFY REGISTRATION FORM

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Delaware*†: Apply to State Examining Board of Physical Therapists, Dover.

Florida*†: Apply to Homer L. Pearson, M.D., Sec., State Board of Medical Examiners, 901 N.W. 17th St., Miami 36.

Georgia*: Apply to C. L. Clifton, Joint Sec., State Examining Boards, 224 State Capitol, Atlanta.

Hawaii*†: Apply to Department of Health, Territory of Hawaii, Honolulu.

Illinois†: Annual examination, third Friday of October. File applications 15 days in advance. Apply to Judge Vera M. Binks, Director, Department of Registration and Education, Capitol Building, Springfield. Examinations held at 160 No. La Salle St., Chicago.

Indiana: Annual examination. Mid-June. File applications by May 15. Apply to Ruth V. Kirk, Exec. Sec., State Board of Medical Registration and Examination, 538 K. of P. Building, Indianapolis 4. Examinations held at Indiana University Medical School, 1100 W. Michigan, Indianapolis.

Kentucky†: Semiannual examinations, April and October. File application by March 1 or September 1. Apply to Agnes Shehan, Sec., State Board of Physical Therapy, Kentucky Crippled Children Association, 982 Eastern Parkway, Louisville 17. Examinations held in Frankfort.

Maine: Thrice yearly examinations. March 10, July 14, November 10. File application 10 days in advance. Apply to Adam P. Leighton, M.D., Sec., Medical Examining Board, 142 High St., Portland. March and November examinations held at Portland City Hall, Portland; July examination held at State House, Representative Chambers, Augusta.

Maryland*: Apply to State Board of Physical Therapy Examiners, 2411 No. Charles St., Baltimore 18.

Massachusetts†: Semiannual examinations, April 14 and October 13. File application by March 31 or September 29. Apply to Board of Registration in Medicine, State House, Boston 33. Examinations held at State House, Boston.

Minnesota*: Apply to State Board of Medical Examiners, 230 Lowry Medical Arts Building, St. Paul 2.

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Nevada*†: Semiannual examinations. Apply to Margaret Heidrick, 506 Humboldt St., Reno. Examinations held in Reno or Las Vegas.

New Hampshire*†: Apply to Edward W. Colby, M.D., Sec., Board of Registration in Medicine, 61 So. Spring St., Concord. Examinations held at State Health Building, 61 So. Spring St., Concord.

New Mexico*: Apply to Registrar, Physical Therapists Licensing Board, Box 2206, Santa Fe.

New York: Semiannual examinations; June 23-24, December 8-9. File applications at least 30 days in advance. Graduates of registered curriculum apply to John W. Paige, Chief, Bureau of Professional Examinations and Registrations, 23 South Pearl St., Albany 7; graduates of nonregistered curriculum apply to Robert C. Killough, Jr., Assistant Commissioner for Professional Education, 23 So. Pearl St., Albany 7. Examinations are held in Syracuse and New York City.

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South Carolina*†: Apply to Ruth S. Linley, Sec., State Board of Physical Therapy Examiners, 319 Walker St., Columbia.

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Tennessee†: Annual examination, second Monday in June. File application one month in advance. Apply to State Board of Medical Examiners, 1635 Exchange Building, Memphis. Examinations held in Nashville.

Vermont *†: Next examination will be held Oct. 24, 1959. Apply to Sophie Myers, Sec., Board of Physical Therapy Registration, Degoesbriand Memorial Hospital, Burlington.

Virginia: Semiannual examinations, February and September. Apply to State Board of Medical Examiners, 631 First St., S.W., Roanoke. Examinations held at Medical College of Virginia, Richmond.

Washington†: Annual examination, May. File applications by April 1. Apply to Professional Division, Department of Licenses, Olympia. Examinations held in Seattle.

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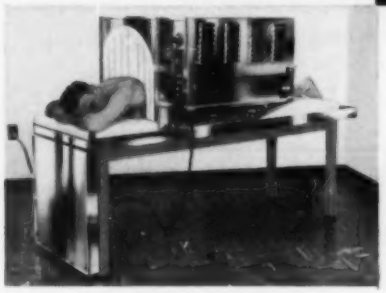

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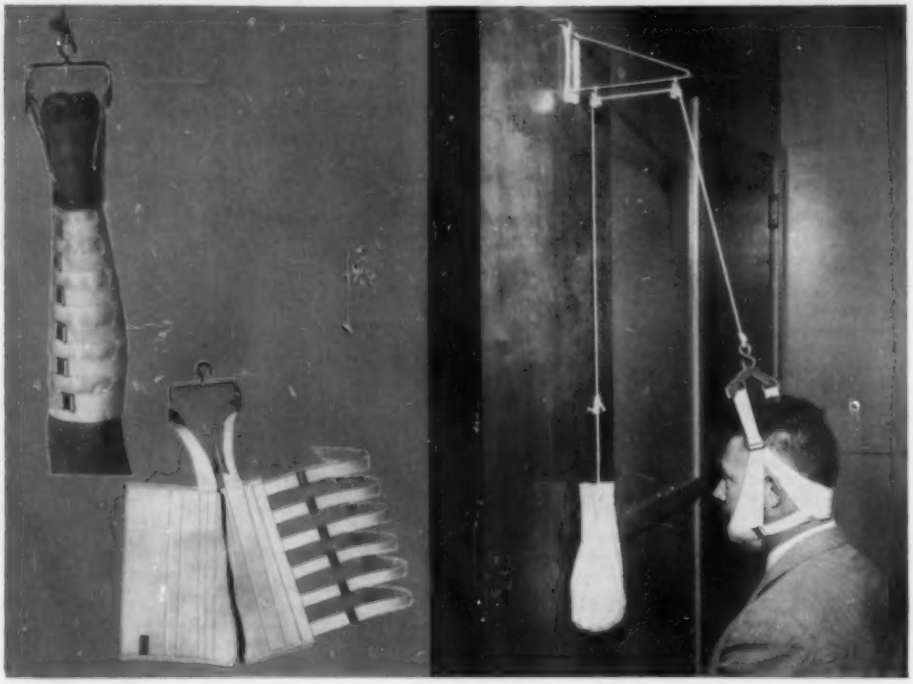

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The Physical Therapy Review

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*Participation of the Abdominal Muscles in Various Movements of the Trunk in Man**

An Electromyographic Study

Miriam J. Partridge, B.S. and C. Etta Walters, Ph.D.

Introduction

The manner in which muscles or parts of muscles contribute to the execution of the numerous motor functions in the human body has been the subject of study and controversy for centuries. Much of the early knowledge was obtained by anatomists through mechanical experiments on the cadaver. In the last half of the nineteenth century, Duchenne[1] presented the scientific world with a publication devoted to the subject of muscular movements. The information collected was the experience of 20 years of dedication to clinical observations and localized faradism of the muscular system in living man. It is the combination of the two technics that makes *Physiology of Motion* a classic.

The late Dr. Charles Beevor,[2] eminent British physician and student of muscular movements in the living subject, considered his method of direct observation combined with palpation of the muscle or tendon during movement, to be a more physiological approach. In the Croonian lectures delivered in 1903, Dr. Beevor states that this manner of observation reveals what the muscle "does do," and not what the muscle "may do."

Utilization of multiple-lead electromyography for kinesiological studies has shown promise in this type of investigation. A survey of the literature reveals little information relative to the participation of the abdominal muscles during a course of exercise designed specifically for strengthening the trunk. Floyd and Silver,[3] in 1950, demonstrated electromyographically the role of the rectus abdominis in head raising from the supine position, in straining and forced expirations, and in alternate leg raising. Campbell,[4] in 1952, reported an electromyographic study of the abdominal muscles in relation to muscular components of breathing. The expiratory function of the abdominal muscles was studied electromyographically by Campbell and Green[5] in 1953. In 1957, Walters and Partridge[6] published an electromyographic account illustrating primarily the behavior of the upper and lower portions of the rectus abdominis during the performance of various abdominal exercises.

It is the purpose of this paper to present an electromyographic study of the patterns of innervations recorded simultaneously from three portions of the external oblique, the middle fibers of the internal oblique, and the rectus abdominis

This study was made during the authors' tenure in the Department of Physical Medicine and Rehabilitation, Research and Educational Hospital, University of Illinois, Chicago. The investigation was supported in part by the Cerebral Palsy Association of Chicago.

Miss Partridge, Supervisor, Physical Therapy Research, Texas Institute for Rehabilitation and Research, The Texas Medical Center, Houston; Dr. Walters, Department of Physical Education for Women, The Florida State University, Tallahassee.

* Presented at the Annual Conference of the American Physical Therapy Association, Minneapolis, June, 1959.

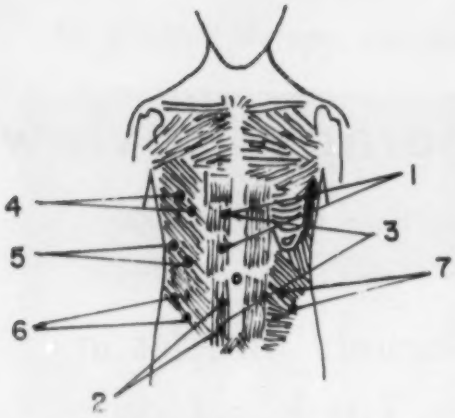

Figure 1. Illustration of unilateral electrode placement used to record electromyograms. Lead 1. Upper rectus abdominis; 2. Lower rectus abdominis; 3. Entire length of the rectus abdominis; 4. External oblique—anterior fibers; 5. External oblique—middle fibers; 6. External oblique—posterior fibers; 7. Internal oblique—middle fibers. Electrode placement was bilateral, duplicating the combinations shown above. Any combination of fourteen leads could be selected.

during trunk movements in the supine and erect positions.

METHOD

There were 3,360 observations made on 2 healthy, well trained female subjects. Of this number, over 1,800 observations were confined to the external and internal obliques. Both subjects of the investigation were endowed with well defined abdominal musculature, free from excess adiposity which assured accurate identification of the muscles for electrode placement.

Paired skin electrodes measuring 8 mm. in diameter were secured to the skin overlying the muscle fibers being studied. The skin was prepared by rubbing the area vigorously with electrode jelly until an erythema was produced. The electrodes were filled with the jelly and secured to the skin with quick drying colodium. The distance between the electrodes was 3 cm. except in those instances when the entire length of the rectus abdominis was spanned. The electrical activity from the muscle was properly amplified and fed through a standard 8-channel Offner inkwriting crystograph. This permitted simultaneous observations of the upper and lower portions of the rectus abdominis, the anterior, middle, and posterior fibers of the external oblique, and the middle fibers of the internal oblique during various trunk movements.

The external obliques were fractionated according to the arbitrary division outlined in Kendalls',[7] *Muscles, Testing and Function.* For example, the anterior fibers of the external oblique are described as originating from the fifth and sixth ribs. The fibers are directed medialward and downward to attach to the aponeurosis. The electrodes were located over the fibers in the course of their direction, i.e. obliquely. Although some fibers of the rectus abdominis attach to the cartilages of the fifth, sixth, and seventh ribs, it is felt that good separation of the activity patterns was accomplished by placing the rectus abdominis electrodes near the midline, in a straight line with the direction of their fibers. The rectus abdominis was divided into upper and lower portions, and electrodes were placed equidistant above and below the umbilicus for some of the experiments. The electrode placements for the middle and posterior fibers of the external oblique were located according to the direction of their fibers and the point of attachment to the ribs respectively. Figure 1 illustrates the relative position of the recording electrodes and the available combinations of recording leads.

All exercises were performed in a precise manner; i.e., the low back was not allowed to hyperextend at any time when the prescribed exercise involved flexing the thorax on the pelvis or lifting the legs. Sit-ups were always preceded by a trunk curl with the low back flattened. All records for comparison were made on the same day. All electromyograms were recorded at a paper speed of 2.5 cm. per second. Selective oscilloscope monitoring was utilized during the experiments.

RESULTS

Standing and sitting postures

Trunk movements performed without resistance in the sitting or standing position reveal little activity in all portions of the external obliques and rectus abdominis. The internal oblique maintains a steady state of contraction during sitting or standing while all other leads are relatively void of any response. This behavior of the abdominal muscles has been reported by other investigators.[3, 6] Figure 2 illustrates quiescence in all leads during standing and forward bending to touch the toes, while a lateral bend of the trunk yields slight activity in the middle and posterior fibers of the external oblique exclusively. When hip hiking is executed against gravity, the posterior fibers are moderately active.

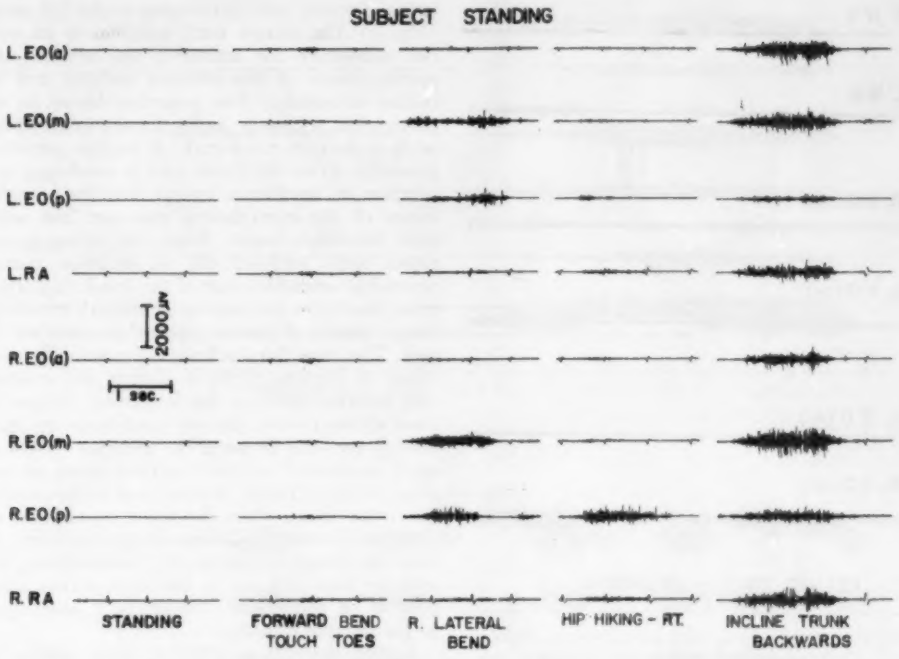

Figure 2. Multiple lead electromyogram demonstrating the participation of the external obliques and rectus abdominis in the standing posture. In this and subsequent illustrations, the abbreviations are as follows: L = left, R = right, EO = external oblique, a = anterior fibers (lead 4), m = middle fibers (lead 5), p = posterior fibers (lead 6), RA = rectus abdominis (lead 3). The regular deflection of the pen observed in some leads is part of the electrocardiogram (ECG) complex and does not interfere with the interpretation of the electromyogram (EMG).

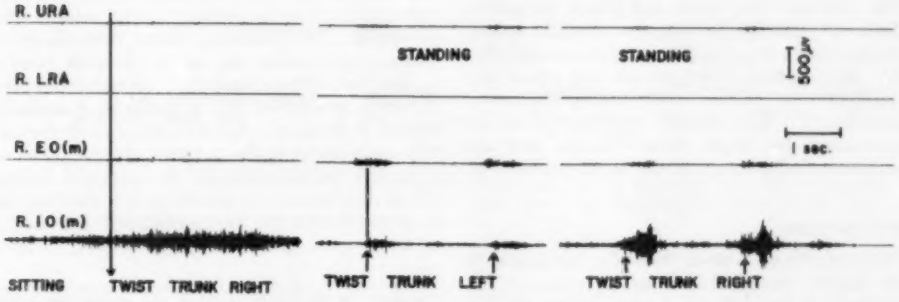

Figure 3. Simultaneous electromyograms depicting rotation of the thorax on the pelvis in the sitting and standing positions. The right internal oblique behaves according to present concepts. Rotation to the opposite side (left) does not completely obliterate the internal oblique pattern and enhances the external oblique pattern. The voltage decrease between the two arrows represents a return of the trunk to the mid-position. URA = upper rectus abdominis (lead 1), LRA = lower rectus abdominis (lead 2).

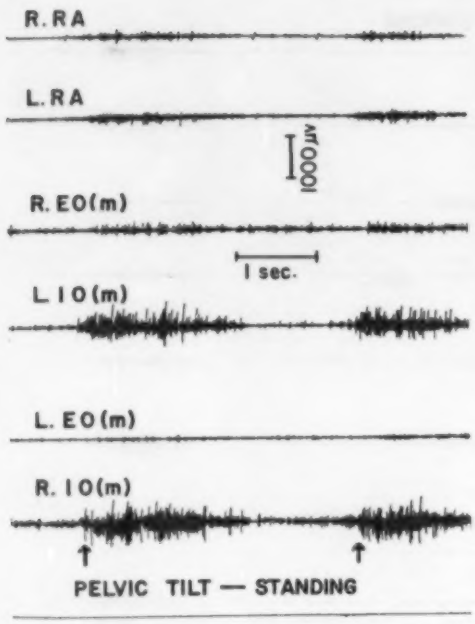

Figure 4. Electromyographic demonstration of the role of the abdominals during performance of a posterior pelvic tilt in the standing position. The arrows indicate the activation of the motion. The obvious voltage decrease in the internal oblique leads represents a relaxation period prior to repeating the designated motion. The initials IO = internal oblique, m = middle fibers (lead 7).

Inclining the trunk backwards calls forth action potentials in all leads. The internal obliques are primarily concerned with rotation of the thorax on the pelvis or vice versa and tilting the pelvis posteriorly (that is, the anterior superior spines move upward). Figures 3 and 4 demonstrate this point. Respiratory functions do not affect the internal oblique pattern until forced expiration is introduced. This forceful expulsion of air is accompanied by slight trunk flexion and an abundance of electrical activity in all leads (Fig. 5).

Supine position

Performance of a sit-up from the horizontal is often highly recommended as an exercise for strengthening the abdominal musculature. In our experience the trunk curl† is just as effective in terms of motor unit recruitment as the full sit-up. (Fig. 6) The reverse curl‡ qualifies as an exercise procedure for activating the anterior and middle fibers of the external oblique and the rectus abdominis. The posterior fibers do not participate as much under these circumstances as in a straight trunk curl. A similar pattern is produced when the trunk curl is combined with rotation of the thorax except that the posterior fibers of the contralateral side are less active than the other leads. When the sit-up is executed with rotation, the innervation pattern somewhat resembles that of the trunk curl. However, due to the greater arc of motion involved a longer period of time is required to carry out the task. The contralateral leads are practically silent when 90 degrees of trunk flexion are attained. The anterior fibers of the ipsilateral oblique behave similarly and do not participate in maintaining the twist phase of the exercise. If the sit-up is performed without the twist phase all portions of the external oblique and rectus abdominis cease firing when the trunk reaches 90 degrees or the erect posture. On the contrary, the internal oblique is only slightly active during this exercise but continues to discharge action potentials at all times when the trunk is maintained in the upright position.

Forced expiration, which is often utilized by physical therapists as a breathing exercise, recruits action potentials in the following manner: (Fig. 7) First, the middle fibers of the external oblique act and are joined by the anterior fibers and rectus abdominis within the next second. As the expiratory force becomes greater the amplitudes of the electrical activity are concomitantly increased. A spontaneous cough evokes motor unit activity primarily in the anterior fibers of the external oblique and the rectus abdominis simultaneously, while the activity in the middle fibers decreases. The posterior fibers throughout this entire performance appear to be quite inactive.

The hip roll§ is a popular exercise often designated to strengthen the abdominal musculature. Figure 8 illustrates that the major contributor in this assignment is the internal oblique. There is a greater participation of the external obliques when the exercise is modified for difficulty and performed with the knees extended and the hips at 90 degrees of flexion. Leg circling,** an ar-

† Trunk curl as used throughout the text refers to raising the head and shoulders off the table to a point where the distance between the seventh cervical vertebrae and the table is about 7 inches.

‡ Reverse curl is accomplished by bringing the knees to the chest in the supine position and raising the buttocks off the table. The arms remain down at the side.

§ Hip roll is performed supine with arms horizontal and palms down. Knees are brought to chest and then dropped to the floor on one side and then back to the other side.

** Leg circling is performed supine from a knee to chest starting position. The knees are dropped to one side and then extended as they are brought around toward the midline and returned to starting position.

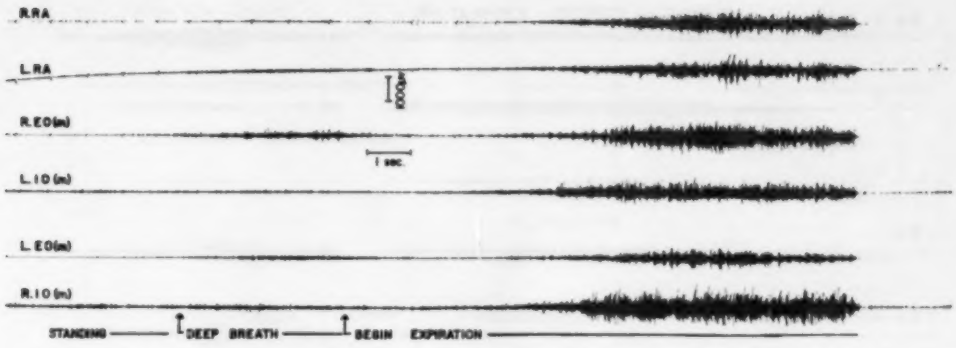

Figure 5. Electromyograms illustrating the effect of inspiration and forceful expiration on some of the abdominals in the standing posture. Slight trunk flexion accompanies the final expiratory effort.

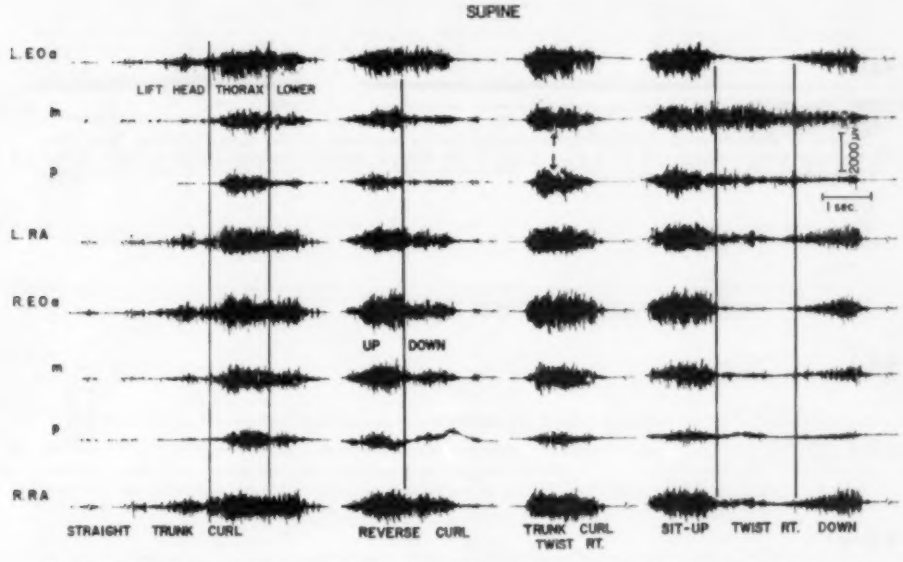

Figure 6. Simultaneous electromyographic observations of the abdominals. Observe the pattern of participation the various portions of the external oblique take during the trunk curl. The anterior fibers are activated synchronously with the rectus abdominis while the posterior fibers do not act until near the end of the arc of motion.

duous maneuver (Fig. 9), appears to have an effective influence upon the external obliques with less activity exhibited by the rectus. Bending the trunk laterally while supine, summons a volley of action potentials from all portions of the external oblique and rectus abdominis on the side toward which the trunk is directed. A pelvic tilt with the legs straight in the supine position is

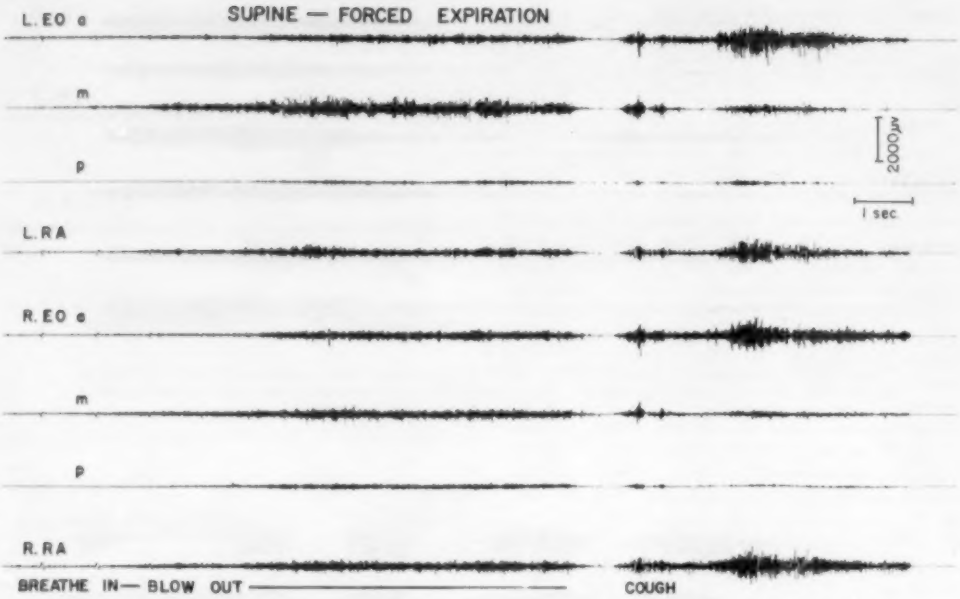

Figure 7. Multiple lead electromyograms during forced expiration in the supine position. Note the decrease in the voltages of the middle fibers of the oblique and the increase of the anterior fibers during a spontaneous cough.

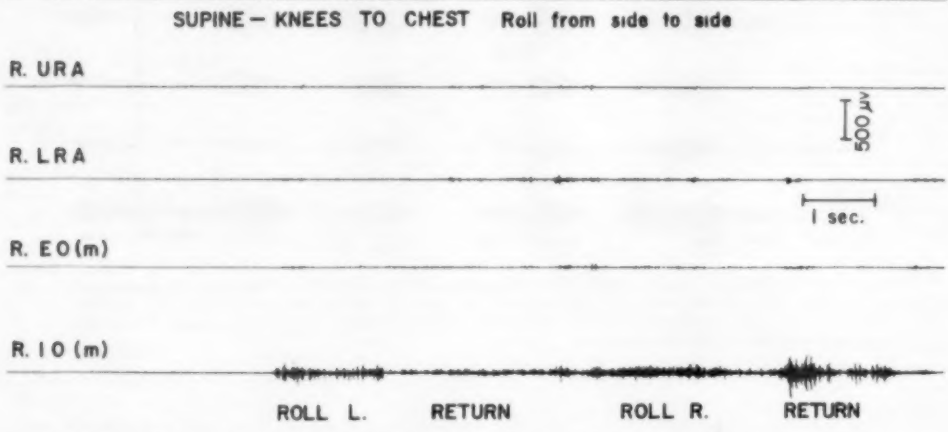

Figure 8. Electromyographic recording from some of the abdominal muscles illustrating the conduct of the internal oblique. When the knees are carried to the left, the right internal oblique acts as a braking mechanism and continues to function during the return phase. The voltages increase as the knees are carried to the right side and then the greatest burst of activity is noted during the return phase from this side.

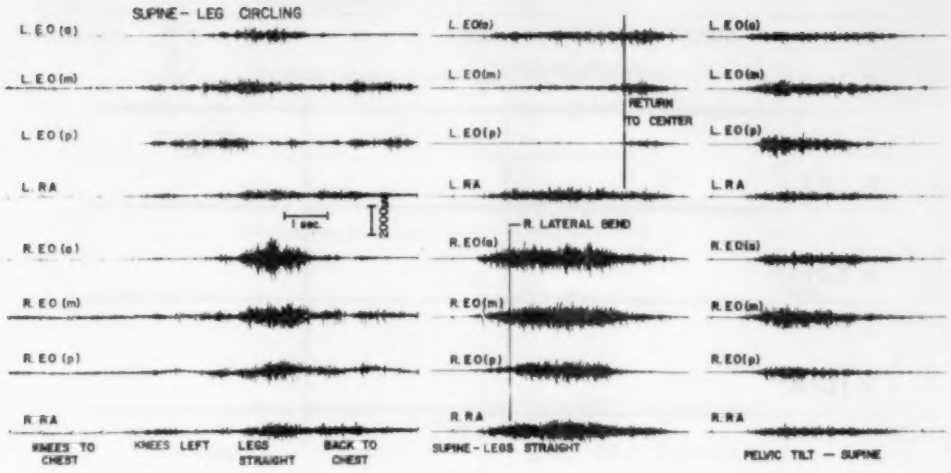

Figure 9. Electromyograms illustrating the diverse patterns of activity of the external oblique and rectus abdominis while performing in the supine position. Note the response of the external obliques when a pelvic tilt is executed in the supine position.

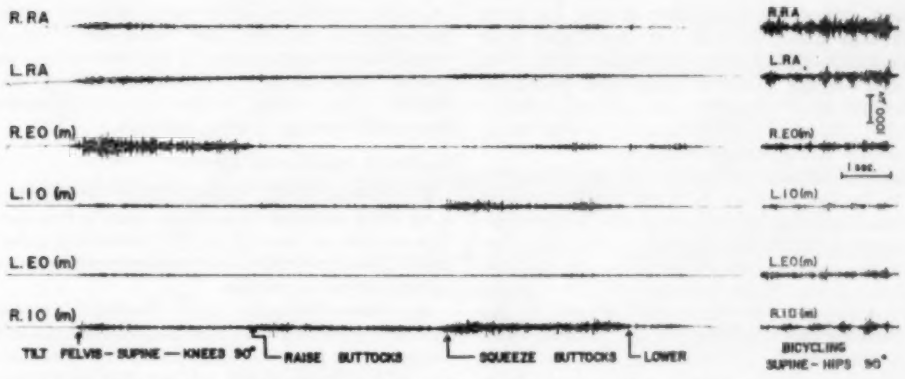

Figure 10. Simultaneous electromyographic recordings of some of the abdominals during a modified Williams exercise (left) and bicycling (right).

far superior for obtaining participation of the external obliques and rectus than when it is performed in the standing posture.

The next two illustrations represent procedures frequently referred to as abdominal exercises. The illustration to the left in figure 10 depicts a modified exercise of the Williams[8] flexion series designed to develop the glutei maximi to which is ascribed the function of flexion of the lumbosacral spine. It is quite apparent that this maneuver fails to yield much in terms of action potentials in the recording abdominal leads. However, synchronous with the contraction of the gluteals is an increase in amplitudes of the internal obliques as they assist in maintaining the position of the pelvis. Bicycling,†† another exercise generally grouped in the abdominal series, causes all leads to fire in phase with the activation of each leg. The electrical response produced is due to the imposed position of the trunk.

†† Bicycling is accomplished from the supine by rolling back and up onto the shoulders, supporting the trunk with the hands and extending and flexing the legs reciprocally.

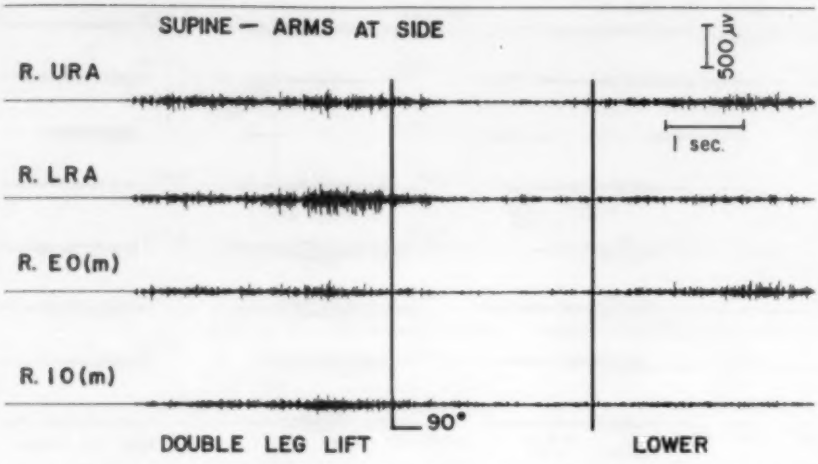

Figure 11. Electromyographic recordings showing the small amount of electrical potential produced during this difficult maneuver.

Most authorities agree that double leg raising‡‡ is a strenuous task but contributes little to strengthening of the abdominals (Fig. 11). The low voltage recorded from these particular abdominal leads supports the clinical opinion that this procedure can hardly be classified as an abdominal strengthening exercise.

The golf swing demonstrated in figure 12, was felt to be the ultimate in trunk motion. Gross electromyographic analysis supports this premise to a certain extent, but careful examination discloses the discriminate action of the middle and posterior fibers of the external obliques. These fibers dominate from the initial address to the ball through the complete arc of the swing and follow-through. It is unfortunate that the internal oblique is absent in this record. Judging from the other observations it is suggested by the authors that the internal oblique is eminently involved in the action.

Incidental electromyographic observations of the rectus abdominis in a patient with anterior poliomyelitis demonstrated abnormal electrical activity while standing. The child was fitted with a corset and one long leg brace. The abdominal muscles were graded "Good" on a manual muscle test. Figure 13 illustrates the excessive amount of electrical activity recorded from the rectus abdominis when the patient stands without the corset. The application of the corset greatly reduces the abnormal activity. The trunk instability is considered a consequence of the weak lower extremity since the rectus abdominis activity was similar, when sitting, to the muscular observations made on the healthy subjects.

‡‡ Double leg raising refers to lifting both legs simultaneously from the floor to 90 degrees of hip flexion and then lowering them.

SUMMARY AND CONCLUSIONS

Electromyographic investigation can supplement other methods of studying muscle function. This manner of recording and preserving information serves to clarify, strengthen, and broaden kinesiological knowledge.

Accurate interpretation of electromyographic studies requires careful attention to the type and placement of the recording electrodes. The posture and attitude of the subject and the motion performed must be clearly documented to examine the findings critically and adequately. The following specific conclusions are offered from the data presented:

Sitting or standing

1. The rectus abdominis and external oblique muscles exhibit little electrical activity in the erect posture unless the trunk is inclined backward or laterally and/or resistance is added.

2. The middle fibers of the internal oblique maintain constant activity when the trunk is erect. This was found also by Floyd and Silver[3] who recorded from the horizontal fibers in their study.

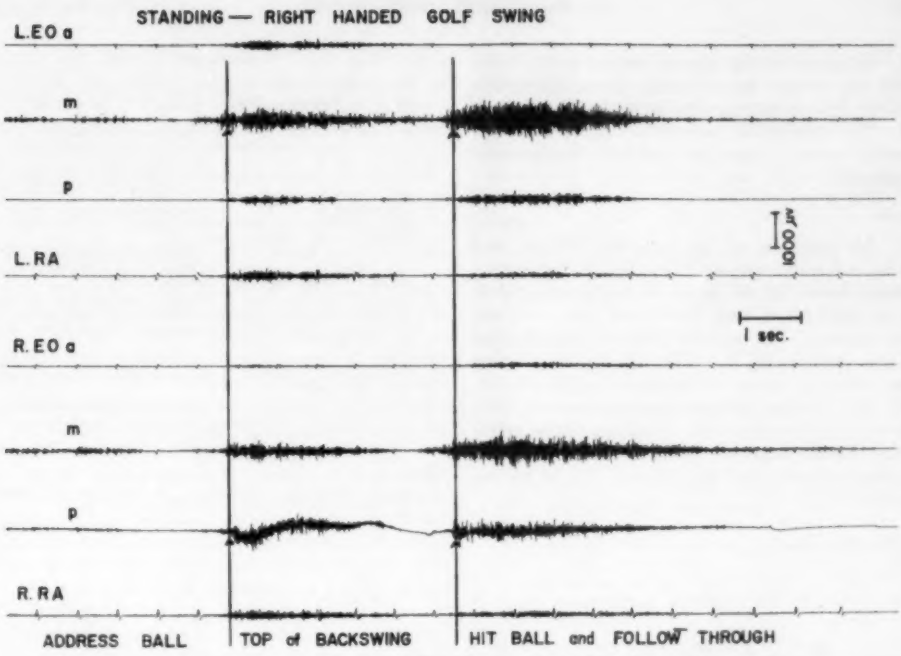

Figure 12. The golf swing depicted electromyographically. The high voltage produced at the moment of impact with the ball probably represents a rapid, forced expiratory component also.

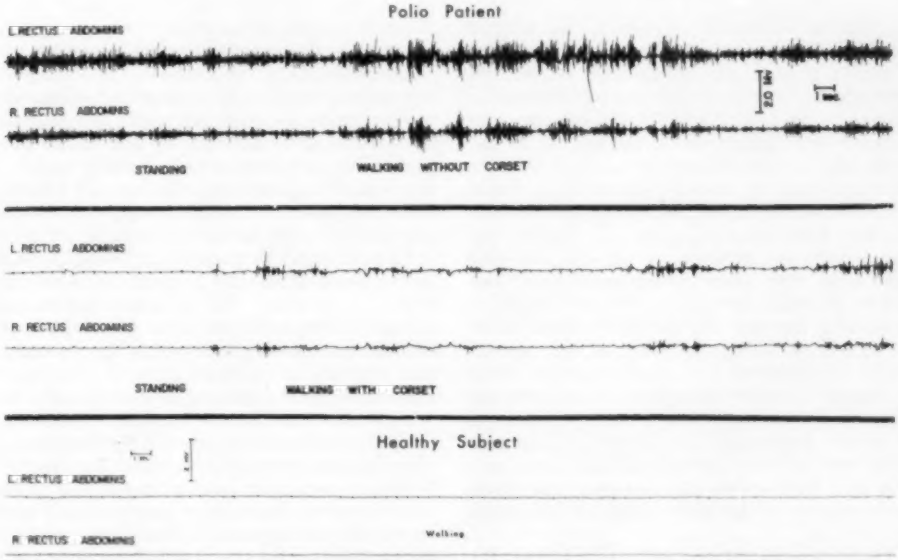

Figure 13. The Physiograph[9] was used to record these electromyograms. Note the lack of electrical activity in the rectus abdominis leads of the healthy subject while walking.

3. Rotation of the thorax on the pelvis or a pelvic tilt evokes more action potentials in the internal oblique during sitting or standing.

4. The effects of supportive equipment applied to patients can be evaluated electromyographically.

Supine

1. All portions of the external oblique and rectus abdominis are activated best in the supine position by a lateral bend of the trunk, pelvic tilt, straight trunk curl, and trunk curl executed with rotation. The middle fibers of the external oblique participate in maintaining the rotation phase when a sit-up is performed with a twist.

2. The internal oblique participates very little during a supine pelvic tilt. Rotation of the pelvis on the thorax (hip roll) and the reverse curl are excellent activators of the internal oblique in this position.

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*Low Back Pain and Sciatica**

John H. Moe, M.D.

Man has no commoner complaint than that of pain in the lower back. It is often accompanied by pain projected into the buttock, or into the lower extremity along the dermatome distribution supplied by the sciatic nerve. Low back pain may be acute and completely disabling; or it may be chronic, not disabling to the stoic person, but poorly tolerated by those less emotionally stable.

Pain sensation originating in the skin is easily localized, but that originating in muscles, tendons, joints, osseus tissue, or viscera may have distribution into other noninvolved areas supplied by the same nerve root. Painful stimuli are transmitted through the posterior spinal nerve root to the spinothalamic tract on the opposite side to the thalamus and cerebral cortex, where the stimuli become interpreted into conscious pain. Since the threshold of pain as here received and interpreted is as variable as the emotional makeup of the person, and since fears, anxieties and frustrations play a major role in the interpretation of the pain stimuli at this level, difficulties arise in evaluating the origin of the pain and in the evaluation of its severity.

The multiplicity of causes of low back pain and sciatica must be recognized and a hasty diagnosis must be avoided. Although the most common cause of disabling low back pain accompanied by radicular sciatic pain is injury or degeneration of the lower lumbar intervertebral disks, one must be constantly watchful that other causes of the pain are not overlooked. (Table 1.)

Painful stimuli originating in joints, ligaments, and muscles of the lower back are directly affected by posture. The dramatic improvement of the patient with low back pain which often follows when he is given proper muscle training and exercise in conjunction with reduction of lordosis by proper bracing is well known to most orthopedic surgeons as well as physical therapists.

Chronic trauma to joints and ligaments is most often associated with a lordotic lumbar spine. While the range or normal variability in such lordosis makes individual interpretation of the lateral X ray somewhat difficult, the routine use of the standing lateral view will be very helpful. Most postural strains are not accompanied by severe muscle spasm and, therefore, the oblitera-

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* This paper and the three case histories that follow were presented at the Annual Conference of the American Physical Therapy Association, Minneapolis, June, 1959.

tion or reduction of the lumbar lordosis by such muscle spasm often will not be manifest. It is well known that excessive lordosis permits intervertebral joints to override with reduction of free space within the nerve root foramina, and also within the neural canal itself. It is almost a certainty that the lordotic lumbar spine assumes a major role in the production of painful stimuli originating in the joints and ligaments and often in the nerve roots themselves.

The muscles which produce lumbar lordosis are those connecting the posterior pelvis with the spine and those connecting the anterior pelvis with the lower extremities. These are called spine extensors and are the erector spinae group behind and the rectus femoris and tensor fascia femoris in front. The iliopsoas probably does not effect lumbar lordosis.

Muscles which flatten the lumbar spine while at the same time decrease the pelvic inclination are the gluteus maximus pulling the back of the pelvis down and the rectus abdominis pulling the front of the pelvis up. Both these muscles are relaxed and weak in the patient with poor posture with lumbar lordosis.

The most satisfactory brace for overcoming lordotic posture is that devised by Dr. Paul Williams of Dallas, Texas. This dynamic apparatus is comfortably worn and is nearly always effective in overcoming low back and sciatic pain due to lordosis. Posture training and flexion exercise without bracing will prove effective in those patients less severely disabled.

The lordotic lumbar spine is intimately associated with degenerative disk disease. One may speculate that disk degeneration occurs more readily in the patient with excessive lordosis, for one frequently observes the combination of the narrowed disk space with the lordotic spine in patients having low back pain or sciatica or both. Narrowing of the disk space is, of course, observed frequently in men and women over 30 years of age, and many of these persons are without symptoms.

It is generally believed that degeneration and inspissation of the nucleus pulposus occurs before the disk contents begin to bulge posteriorly or to migrate out as a sequestrum into the neural canal.

Conservative and surgical treatment of disabled patients with evidence of pathological lumbar disks is greatly enhanced if the attending physician will take the time to carefully explain the mechanism and anatomical features of the patient's trouble. Illustrations are helpful, as are sketches by the physician. Perhaps most helpful of all are the specimens of articulated lumbar spines or the plastic reproductions thereof. A clear understanding of the mechanical nature of the patient's problem will allay fear and anxiety, and make for a more cooperative patient. Nowhere in the field of medicine is a good physician-patient relationship as important as in dealing with the problem of low back pain and sciatica.

TABLE 1

CLASSIFICATION OF CAUSES OF LOW BACK AND SCIATIC PAIN

I. Chronic trauma, due to
   - Bad postural habits, lordosis, etc.
   - Pregnancy
   - Obesity
   - Contracted tensor fascia lata

II. Acute trauma
   - Fracture—vertebral bodies, pedicles
   - Dislocation—intervertebral
   - Sprain—intervertebral joints
   - Intervertebral disk rupture

III. Arthritis
   - Rheumatoid—sacroiliac, posterior intervertebral joints, hip joint
   - Marie-Strumpell type
   - Osteoarthritis, vertebral, hip joint
   - Gout

IV. Degenerative intervertebral disk
   - Associated with trauma, without trauma; with poor posture

V. Bony anomalies
   - Congenital anomalies—butterfly transverse process, joint anomalies
   - Spondylolisthesis, spondylolysis

VI. Neoplasms
   - Malignant, vertebral—metastatic, myeloma, osteogenic sarcoma, etc.
   - Benign, vertebral—giant cell tumor, osteoid osteoma, osteochondroma
   - Local tumor in conus or cauda
   - Local tumor, extramedullary
   - Adjacent visceral tumor—prostate, rectum, ovary, uterus
   - Adjacent bone tumor, benign and malignant (femur-pelvis, etc.)

VII. Osteoporosis, vertebral
   - Idiopathic
   - Postmenopausal
   - Senile

VIII. Local inflammation
   - Arachnoiditis
   - Hemorrhage, subarachnoid; hematomyelia
   - Epidural abscess
   - Vertebral osteomyelitis
   - Disk space infection
   - Retroperitoneal abscess
   - Inflammation in adjacent viscera
   - Herpes zoster

IX. Systemic disease
   - Guillain-Barré syndrome
   - Neuritis
   - Fibrositis
   - Acute systemic fever

X. Vascular insufficiencies
   - Aorta and common iliac

Trigger points of skin or tissue sensitivity are common in low back pain. These are generally found over the sacroiliac or gluteal area. The response to the infiltration of these areas with procaine is sometimes most gratifying.

The relationship of low back pain to congenital anomalies of the lower spine is variable. Some such anomalies, such as spina bifida occulta, are of no significance. Others, like persisting parasagittal low lumbar facets, or facets in unequal planes may contribute to back strain. Lumbarization of a sacral vertebra, with a unilateral articulating transverse process undoubtedly may be a source of strain.

An anomaly of great importance is that associated with spondylolisthesis. Here the bony defect is not in the pedicle, but in the pars interarticularis bridging the superior articular process with the inferior one. The posterior neural arch consisting of spinous process, laminae, and the inferior articular process and facet is, therefore, loose, being held only by the overlying muscles, the interspinous ligament, the ligamentum flavum, and the articular capsule. The defect itself overlays the nerve root making its exit, and is filled with a variably sized mass of fibrous tissue. This fibrous mass may, and often does, encroach upon the nerve root causing pain.

There is no embryological explanation for such a defect in the pars interarticularis. It is felt that it represents an unhealed fracture. When the defect is present without vertebral displacement, it is called spondylolysis. With displacement of the vertebral body forward, it becomes a spondylolisthesis. The incidence of this defect increases throughout the growth years. Many patients having this anomaly are asymptomatic until adult life. They are especially prone to become symptomatic after some form of back sprain or other injury.

If accompanied by nerve root irritation, surgical treatment must include nerve root decompression with removal of the fibrous mass. Surgical fusion across the defective vertebra usually offers the best cure. Conservative measures such as those used for a disk prolapse should always be carried out prior to surgery.

Myelography in the diagnosis of disk lesions is avoided by some orthopedic surgeons on grounds of possible tissue sensitivity to the contrast media, with production of arachnoiditis. With careful technic, it is possible to withdraw all of the pantopaque when the examination is completed. The danger of irritative complications is thus placed at a minimal level. Careful clinical examination will make a correct diagnosis possible in 90 per cent of disk lesions. Myelography is likewise about 90 per cent accurate. By combining the two methods of diagnosis, there should be a minimum margin of error. There is often a tendency to place too much reliance on the myelogram in determining the need for surgery on the disk. The careful clinical evaluation, including psychosomatic appraisal, is of greater importance.

The injection of contrast media directly into the disk is called discography. This diagnostic procedure will show widespread extravasation of considerable amounts of contrast media in the presence of disk degeneration. The media will escape into the neural canal in the presence of disk extrusion, and the injection of the disk will reproduce the patient's pain in the presence of an offending disk. Degenerated disks are common and the enthusiast will find that this test will encourage unnecessary and often harmful surgery. This procedure should be used and interpreted with caution.

Treatment of the mildly offending disk should be conservative. It is preferable for the patient to live with mild discomfort and occasional disabling recurrences than to undergo surgery. The best surgical results are obtained in completely disabled patients with completely extruded disks. Even the more severely afflicted patient deserves a trial of conservative treatment. Myelography should not be done unless surgical treatment is being strongly considered. One should not delay and procrastinate in the presence of neurological deficits which may become permanent, such as severe muscle weakness.

Conservative treatment begins with bed rest, pain relieving medications, hot fomentations to the back, muscle relaxing drugs, and leg or pelvic traction. If such traction does not give relief, it should not be used. Most patients find maximal relief in the flexed position, but some find most comfort when supine on a firm bed. As pain and muscle spasm lessens, flexion exercises in bed are instituted under supervision. A flexion cast or a Williams brace are applied as the patient again becomes ambulatory.

Failure in the operative treatment of disk lesions is due mainly to a poor selection of cases and to a mistaken diagnosis. Surgical excision of extruded offending disks will give satisfactory relief of sciatic pain in 85 per cent of such lesions. The relief of back pain is less encouraging. If the offending disk space is solidly fused at the time of initial disk surgery, end results are somewhat more satisfactory. A postoperative regimen which includes muscle reeducation and postural

training is important. Sympathetic reassurance will help eliminate the patient's fears and phobias.

One must be ever alert to the possibility that the patient's disk symptoms may be due to causes far removed from the lumbar disks. Infection in the sacroiliac joint, malignant tumors of pelvis or upper femur, osteoid osteoma of the same areas, vertebral or cord tumors, all can produce a clinical syndrome strongly suggesting that of an offending intervertebral disk. In patients of middle age or older, a painful osteoporosis of the spine may produce both back pain and sciatica. The same is true for an early rheumatoid spondylitis.

SUMMARY AND CONCLUSIONS

Low back pain and sciatica can arise from a great number of causes. The most common etiological factors are those of degeneration and migration of the intervertebral disks of the low lumbar spine and postural strain due to lumbar lordosis and faulty posture. All of these common etiological factors frequently exist in combination. Conservative treatment of the prolapsed disk in a cooperative patient will produce satisfactory relief of pain in a high percentage of patients. Those not responding to such measures after two or three weeks should be carefully reevaluated for consideration of surgical treatment.

First Case History

Low Back Pain

Elizabeth Fowler, Major, AMSC

A 48 year old male U.S. Army officer with 18 years of active service was admitted to Letterman Army Hospital on March 16, 1959, with complaints of low back pain with radiation to the left lower extremity.

The onset of this episode of pain had been gradual beginning in October, 1958, after he had spent one day working with concrete while building a patio. His current duty involved desk work combined with moderate activity.

He had had one previous episode of a similar nature in the winter of 1953. This had begun without definite history of injury or strain while he was engaged in duties which were primarily desk work. The onset was gradual. Physical therapy, which was prescribed for a period of six weeks, consisted of short wave diathermy followed by massage. He had no exercise program. He was also fitted with a "chair-back" type brace which he wore for approximately 6 to 7 months. At that time he had had complete relief from pain. He then remained completely asymptomatic until the onset of the current episode.

Several weeks after he had first noted back pain, it became severe enough so that he reported to the medical officer. He was again given treatment with short wave diathermy on an outpatient basis but without relief.

His pain persisted and he was then referred to an orthopedic surgeon. For the following two weeks he was treated at home with pelvic traction, bed rest, and heat in the form of an electric heating pad. He returned to duty in the middle of December wearing a belt-type back brace.

Two months later he had had no relief from his symptoms. The surgeon then recommended hospitalization with possibility of surgery for a herniated disk. He was then admitted to Letterman Army Hospital's Orthopedic Service.

Physical examination on admission was negative except for the following findings: The back revealed a thoracic scoliosis to the right, a flattened lumbar area, moderate spasm of the back muscles, marked limitation of flexion, and extension of the spine with no limitation of lateral bending. Leg movements were described as equal. All reflexes were present and equal. Straight leg raising was limited to 50 degrees on the right, 30 degrees on the left. Abduction, adduction, and both internal and external rotation of the lower extremities were equal and normal. Some weakness of extension of the left great toe was present. There was no sensory loss, although the patient reported that the left lower extremity "goes to sleep easily." In addition, he complained of pain on coughing and sneezing.

The patient was put on bed rest. On March 20, physical therapy was prescribed consisting of moist air cabinet followed by flexion exercises. The moist air treatment was given with the patient in a prone position. The following exercises were taught: (1) pelvic tilt, (2) partial trunk flexion "roll-up" reaching toward knees, (3) partial "roll-up" reaching to alternate sides, (4) active hamstring stretching in supine position holding thigh at 90 degrees with the hands and actively extending the knee. He was taken to the physical therapy clinic via wheel chair and except for these trips was kept on bed rest. Treatment was given once daily, five days a week. He received a total of 13 treatments. He also received Tolserol.

He improved slowly on this program. On March 27, straight leg raising was normal on the right and had increased to 50 degrees on the left. Four days later it was noted that he was able to walk freely for periods of 20 minutes. Straight leg raising on the left had then increased to 60 degrees. The radiation of pain to the left lower extremity persisted.

U. S. Army Hospital, Augsburg (11th Field Hospital), APO 178, New York, N. Y.

On April 3, a new "chair-back" brace was ordered and the patient was informed that he would return to duty when it was completed. His physician stated that he did not feel that surgery was indicated at that time and that he expected the patient to show gradual improvement in symptoms as he had shown following his previous similar episode.

On April 6, the patient stated that he had considerable relief from his pain. Immediately following physical therapy treatment he noted some muscle soreness from which he recovered with two hours rest. At this time the scoliosis was still present despite the subjective improvement.

On April 8, the patient was discharged from the hospital to resume his previous activity and was instructed to wear his brace. He was able to perform duty but did not obtain complete relief from pain.

On May 14, he had a sudden exacerbation of symptoms during the day and was unable to get out of bed the following morning. He stated that he had pursued only his normal activity. He was unable to tolerate traction or pressure of any kind on his back or left hip. At the end of a week he noted numbness of the left lower extremity.

He was readmitted to Letterman Army Hospital on June 4. The admission note stated that the pain was aggravated by coughing and bowel movement. Hypesthesia was present over the left great toe in a band diagonally across the dorsum of the foot, above the lateral malleolus, and up the lateral aspect of the leg halfway to the knee. Dorsiflexion of the left great toe was poor. No reflex changes were noted. There was a slight thoracic scoliosis and he tended to walk with a list to the right. Forward flexion of his trunk was limited to about 30 degrees. Straight leg raising was 40 degrees on the left, 75 degrees on the right.

He was put on bed rest in a contour position and was permitted bathroom privileges. On June 9, physical therapy was started with Hydrocollator moist heat packs and the same exercise program as previously. He came to the clinic via wheel chair. In addition he received medication consisting of aspirin and Equanil every 4 hours.

On June 11, treatment was changed to the moist air cabinet because the weight of the Hydrocollator packs on his back aggravated the pain. The following day his exercise program was discontinued because this activity also caused aggravation of pain. He felt that the moist air cabinet aided in relaxation. The program of bed rest and physical therapy was continued.

On June 17, he was seen on consultation by the Neurosurgery Service. The physical findings were essentially the same as on admission except that straight leg raising on the left was limited to 25 degrees. The probable diagnosis of herniated intervertebral disk at the fourth lumbar interspace on the left was made. The patient was to be transferred to the Neurosurgical Service and scheduled for myelography.

Within two weeks the patient had surgery, a laminectomy, and he was not referred again for physical therapy following surgery. Within three weeks after surgery he left the hospital for a 30 day convalescent leave, and upon leaving, stated that he had noted steady improvement in mobility and relief of pain.

Second Case History

Postoperative Herniated Nucleus Pulposus

Mike Kumpuris, B.P.E.

A 40 year old female practical nurse experienced a sudden, twisting fall in 1955. As a result she developed severe low back pain which was relieved with bed rest. During the next three years, she had recurrent episodes of low back pain which were elicited usually by extending the trunk from the forward flexed position. These episodes of pain were relieved by heat and bed rest.

In mid-September, 1958, without a specific injury, her pain shifted to the posterior left thigh and calf with an associated numbness of the lateral aspect of the calf and foot. At this point she was examined by a neurosurgeon. He found a loss of strength in the gastrocnemius-soleus muscle group and a severely diminished achilles tendon reflex on the left. The Lasèque and Naffziger signs were positive. Range of motion of the trunk in forward and left lateral flexion were limited. The patient stated she had no tenderness or pain in the lumbar region. A diagnosis of herniated nucleus pulposus on left of the fifth lumbar to the first sacral with nerve root irritation was made.

The patient was put on a conservative treatment program consisting of bed rest in Fowler's position. Hot tub baths of 20 minutes duration twice daily, and trunk flexion exercises from hook-lying position were performed 10 times each, 3 times daily as follows: (1) pelvic roll, (2) single knee to chest, (3) double knee to chest.

On October 13, the patient's symptoms had not changed. On October 27, a myelogram showed a large defect on the left side of the lumbosacral interspace and a smaller defect at the interspace of the fourth and fifth lumbar. A complete laminectomy was performed on the left of the fifth lumbar with a repair made at both interspaces.

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On the second postoperative day, the patient's bed was changed from completely horizontal to Fowler's position and the original three exercises were started again three times daily.

On the fifth postoperative day, the patient stood at bedside for the first time. The exercise program was continued.

On the eighth postoperative day, the patient was taken to the physical therapy department. On arrival she was visibly nervous and tense and complained of pain and cramping in her posterior hip, thigh, and calf regions. A muscle test proved the left gluteus medius gastrocnemius and soleus muscles to be "fair minus" in grade. Her gait lacked toe push-off and she had a shoulder lurch during left leg stance phase. She had a positive left Trendelenberg sign.

The physical therapy program was expanded by the addition of treatment in the Hubbard tank at 102 degrees Fahrenheit for 15 minutes. The same trunk flexion exercises were continued with the addition of strengthening exercises for gastrocnemius-soleus muscles and the gluteus medius. Lastly, the patient was instructed in the following instructions to be used in activities of daily living:

1. Sit up from back-lying by turning on your side, drop both feet off the bed and simultaneously push up to sitting position using both hands.
2. Stand up by moving to edge of the bed, put both feet on foot stool and push up to standing using your feet and hands. Step to the floor with left foot first using the bed for support.
3. Do not hyperextend the trunk, walk without aid, or get overtired while sitting or standing. (These precautions were given to prevent unwarranted pain or muscle spasm in the lumbar area and left lower extremity.)

On the ninth postoperative day, gait training was started. Assistance was given through the right hand. We instructed the patient to shorten her steps and hold her trunk erect.

On the tenth postoperative day, the exercise program was further expanded by adding trunk rotation and lateral flexion exercises while the patient sat with knees flexed.

On the eleventh postoperative day, the pelvic tilt was taught to the patient while she stood with her back to the wall. Gait training without aid or support was begun. The patient held her trunk erect, her movements were slow, and her steps measured 12 inches. At this time her gait problems remained the same but the Trendelenberg was absent.

The patient stated she felt less pain and cramping in her back and lower extremity. She was no longer tense. The range of motion of forward flexion was 70 degrees. The range of trunk rotation was 30 degrees bilaterally and was normal.

By the fourteenth postoperative day, the physical therapy program consisted of 9 exercises performed 10 times each and 3 times daily, gait training, and Hubbard tank once daily.

At this time the following exercises and instructions were added:

1. Stand with feet 12 inches apart and toes pointed outward. Keep the heels on the floor. Squat, putting the hips on the heels, and reach the hands to the floor in front of and between the feet.
2. Sit on a stool with knees flexed and legs apart. Bend forward and touch your hands in front of and between your feet.
3. Stand equally on both feet. Perform a pelvic roll, hold it and breathe. This exercise is to become a habit to be performed every time you stand still. A great amount of emphasis was placed on this point since one of the ultimate objectives was to eliminate a part of the lordosis in standing posture.

On the sixteenth postoperative day the patient was discharged from the hospital on a home treatment program planned as follows:

A. Hot tub bath of 20 minutes duration twice daily.
B. The 12 exercises already instituted were to be carried out after each bath.
C. Activity of daily living guides were to be observed with the following specific instructions:

1. *Sit* only in a straight chair with knees flexed higher than hips. Put feet on a stool.
2. *Walk* erect and relaxed. Gradually increase the distance walked so that you do not get overtired.
3. *Squat* to pick up anything on or near the floor. Do not pick up anything heavier than your shoes.
4. *Stand* with the pelvis tucked under so that the low back is flat.
5. *From sitting position* stand up by moving to front edge of chair, one foot slightly in front of the other; bend the trunk forward and rise.
6. *Get out of bed* by turning to your side, drop your feet off the bed and simultaneously push up to the sitting position with both hands.
7. *Avoid fatigue* or overexertion. If pain develops, rest in bed with knees flexed.
8. *Do not drive* a car. Do not ride in a car unless it is absolutely necessary.

Dec. 15, 1958, six weeks postoperatively, the patient was checked in the office of the neurosurgeon. At this time she had no pain but complained of numbness in the lateral aspect of the left calf. She stated this had lessened. Range of motion was normal in straight leg raising, forward flexion, lateral flexion, and rotation of the trunk. She could take 10 to 12 steps on tip toes before tiring; however, she still had a shoulder lurch on left leg stance.

The home treatment program was continued with the addition of sitting up from the "hook-lying"

position with legs abducted. On sitting up the patient was instructed to reach forward and touch her hands in front of and between her feet.

Jan. 28, 1959, three months postoperatively, the patient's strength, range of motion and gait appeared normal. The achilles tendon reflex was improving and numbness was less. The patient had started part time work as a private duty nurse. She had no complaints at this time. The home exercise program was reduced to two exercises in the "hook-lying" position—double knee to chest and the sit-up. The pelvic tilt was continued in the standing position. The patient was cautioned to lift properly by using her lower extremities.

Apr. 6, 1959, five months postoperatively, the patient's strength and range of motion were normal. The achilles tendon reflex was more active and numbness in calf was further diminished. She stated she had no pain. She was instructed to continue the exercise program indefinitely and was discharged to full time work.

Discussion

The objectives of this treatment program were to assist in the reduction of pain, increase strength and range of motion in forward flexion, lateral flexion, and rotation of the trunk. Most important, we tried to obliterate the lumbar lordosis through active exercises. Finally, we tried to teach this patient how to live with and protect her low back.

We provided for gradual progression in the treatment program. In other patients with a single disk lesion and without the peripheral nerve irritation, we encourage walking sooner and have them progress through the active exercise program more rapidly. The hospital stay of these patients is considerably shorter.

Third Case History

Recurrent Back Pain—Emotional and Physical Aspects

Margaret L. Sexton, B.S., Ronald Leonard, B.A., and Josephine Buchanan, M.D.

S. S., a 27 year old male physician, was admitted to D. C. General Hospital with the chief complaint of intermittent, severe low back pain. Approximately 36 hours prior to admission he was involved in a minor automobile accident. He was thrown slightly forward but did not strike the steering mechanism. Experiencing no pain he proceeded home. Thirteen hours later, upon arising, he noticed some discomfort in the left lumbar area. Three hours later, while walking across the room, he experienced the sudden onset of acute pain and muscle spasm in the same area. There was some radiation of pain into the thighs, especially on the left. This was partially relieved by rest; however, the slightest movement brought on an acute episode. A physician was called, analgesics were administered, and hospitalization was advised when the patient did not respond to treatment.

Examination upon admission revealed an apprehensive, well nourished male in considerable pain. A complete examination was not possible because he was fearful of every movement. Findings were essentially negative with the exception of an area of extreme tenderness from second lumbar to first sacral vertebrae, accompanied by severe spasm of the paravertebral muscles. Straight leg raising on the left was limited to 10-15 degrees and on the right to 50 degrees. X rays of the lumbosacral spine were reported as negative. Oral temperature was 100.6 degrees F. The sedimentation rate was elevated, 40 mm/hr with a hematocrit of 44 per cent. On the second day of hospitalization his fever spiked to 103 degrees F, dropped to 100 degrees F on the third day, and thereafter remained normal. Further examinations and studies ruled out the possibility of osteomyelitis, poliomyelitis, and epidural abscess, and/or hematoma. No definite diagnosis was made at this time but treatment was directed at the control of the muscle spasm and pain.

Past medical history revealed that S. S. had had chronic low back pain since childhood and the condition was occasionally aggravated by physical stress and strain. Approximately seven years ago he had an acute attack which resolved spontaneously and completely.

It was apparent from the beginning that here was a physician who was distraught, highly tense, and emotional. He was well aware of the possible complications that could develop. Since no diagnosis and plan of treatment were immediately made, his feelings of apprehension, frustration, and agitation increased during the lull which followed the initial attentions of the diagnostic team. Medications and bed rest, his only treatment during this period, did not alleviate his feelings of neglect.

During the first week nursing care was extremely difficult because of his constant fear that even the slightest movement would trigger an episode of pain and spasm. For example, the changing of his bed linen had to be deferred two days. He required considerable amounts of Chloral Hydrate, Nembutal, Demerol, Codeine and Equanil throughout his hospitalization.

A physical medicine consultation was requested on the fifth day following admission because he was not improving as expected. When first seen by physicians from this department the patient still had severe pain and was reluctant to move

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or be moved. He held himself rigidly and every activity was accompanied by much groaning, grimacing, and sweating. The physicians felt he had considerable pain but that this was magnified by his apprehension.

His prescribed regimen of treatment was hot packs followed by electrical stimulation using a surging faradic current of medium intensity. These were ordered twice a day to the lumbosacral area. Dramatic though not complete relief of pain was noted immediately following the first treatment.

Gradual improvement continued during the following days and the patient became less fearful and therefore more relaxed. It was felt the favorable results and the patient's change in attitude were due to three things:

1. Definitive treatment producing some relief,
2. An empathetic manner establishing rapport,
3. A firm but kind approach toward motivating the patient to participate in treatment.

When the muscles were in a more relaxed state following the electrical stimulation, graded activities were introduced. Starting with active assistive exercises for all extremities he progressed to active and resistive exercises, and soon was able to maneuver to a sitting position on the side of the bed. He was shown how to protect his back while moving and this increased his confidence and his willingness to cooperate.

With gentle but firm insistence the duration and frequency of his activities were increased. Gradually the severity, frequency, and duration of the spasms decreased, and on the sixth day of treatment he was brought to the department for a more intensive program. Use of the tilt table was begun and, after tolerating it well, on the next day he progressed to sitting in a wheel chair. Following this he began walking, first between the parallel bars and then with a walker. By the ninth day he had progressed to walking in a stiff, slow, and awkward manner, holding his body quite rigid.

By this time the patient was insisting on returning home for his convalescence. The attending physician became concerned with the almost claustrophobic reaction to continued hospitalization and on May 5, 15 days after admission, reluctantly agreed to discharge him. Instructions for home treatment included rest and graduated activities. Medications included Equanil and aspirin which he used for two weeks.

S. S. was not seen again in the Physical Medicine Department until one month later. At this time he was walking quite slowly, still maintaining the rigid posture. On examination, trunk flexion and straight leg raising were found to be moderately limited and the paravertebral muscles still tense. Fear of triggering spasm was the greatest deterrent to this man's progress.

It was interesting to note that while at home one month without adequate guidance and encouragement, few gains were made. He still spent a great part of the time in bed and needed a walker most of the time in order to move about the house. He then returned for intensive physical therapy which included ultrasound, massage, pulley work for all extremities, back strengthening exercises, rolling, and crawling. Efforts were also directed toward obtaining a more easy and natural gait pattern. Within two weeks he had made such remarkable improvement that he felt he could return to work on a limited schedule.

It was the conviction of all those concerned with this patient that his rapid gains were to a large extent the result of the excellent interpersonal relationship developed between him and his therapist. The therapist was given great freedom in choosing and directing the treatment activities and in altering them daily according to the patient's current need. Unfailing confidence in the therapist was evident when all suggested activities were undertaken. Some coaxing was employed with repeated statements of assurance that he could accomplish the activity.

On July 1, he returned to work and was discharged from the Physical Medicine Department. Periodic checks throughout the year showed continued improvement. One year after onset there was no limitation of activities and he had been completely pain free for two months.

An interesting development recently occurred in this case. Diagnosis at time of discharge from the hospital was acute viral infection complicated with acute myositis of the back following mild trauma.

X rays of the back taken in April, 1959, one year later, for follow-up study revealed the following:

"Narrowing of the disk space between the fifth lumbar and the first sacral vertebrae with hypertrophic spurring."

Physicians now agree that this clearly represents degenerative arthritis of the lumbosacral joint.

SUMMARY

A 27 year old house physician having sustained minor trauma to his back in an auto accident, to which he paid little attention at the time, within 36 hours was hospitalized for acute and severe back pain secondary to muscle spasm. The patient had a history of chronic back pain since childhood, the most recent attack occurring seven years previously, which resolved spontaneously.

Medications and bed rest offered some relief, but the patient, cognizant of the conditions such symptoms suggest, was highly apprehensive and resentful of what he believed to be an impersonal attitude of the doctors and nurses.

Physical therapy was ordered five days after admission and a change of attitude was noted almost immediately when the first treatment produced marked though not complete relief of pain. Continued improvement was made and was believed to be the direct result of:

1. Definitive treatment producing some relief.
2. An empathetic manner establishing rapport.
3. A firm but gentle approach toward motivating the patient to participate in the treatment.

The subsequent X rays revealing degenerative

arthritis taken one year after onset would probably in no way have influenced the physical therapy regime.

The importance of establishing good interpersonal relationships between the patient and therapist has been stressed. This combined with good treatment technic resulted in improvement and the patient's return to normal activities.

*Sprains, Strains, and Whiplash Injuries**

Gordon M. Martin, M.D.

The pain of a strain or sprain has been experienced by nearly everyone. Although pain experienced in the distant past may be difficult to remember or describe accurately, the immediate and early symptom of pain, relative to these injuries, can be most useful and important to the physician in establishing a diagnosis. Accurate description of the pain aids in locating the site of injury, in determining structures involved, and in evaluating the extent of injury. However, an accurate description of a pain being experienced by a patient is difficult to obtain and can be elicited best by specific questioning by the physician. Even then the physician recognizes the varied interpretations different individuals give this symptom, thus making it essential to rely also on physical and laboratory findings for diagnosis. Lewis[1] has said that pain is the interpretation that the cerebrum gives to certain sensory stimuli. In the same vein, Beecher[2] has said "pain cannot be satisfactorily defined, except as every man defines it introspectively for himself." With these thoughts on pain in mind as we approach the topic of sprains and strains, perhaps we can say with some justification and with apologies to *My Fair Lady* that "The pain in sprain is mainly in the brain."

Since physical therapy is an essential part of the treatment of many sprains, strains, and whiplash injuries, it is pertinent to review these topics, relative to mechanisms involved, pathologic changes, incidence, and methods of treatment.

Definitions

Sprain.—A sprain is a partial or complete tear or stretching of one or more of the ligaments about a joint caused by sudden twisting or wrenching of the bones that constitute the joint, with varying degrees of injury to adjacent soft tissues, joint capsule, and cartilage.

Strain.—A strain is a stretching, tearing or rupture of muscle, tendon, or fascia, generally produced by a quick unbalanced muscular contraction.

Whiplash Injury.—This term indicates injury to the soft tissues of the neck, which is generally considered to consist basically of a sprain of one or more of the ligaments along the cervical part of the spinal column, and occurs secondary to the well known whiplash mechanism encountered frequently in automobile accidents.

Mechanisms

Mechanisms involved in both sprains and strains at the time of the acute trauma to the tissue are the result of sudden, unusual, and unexpected physical stress. In sprain, generally the associated muscular supports and protective mechanisms of the joint are relaxed or else are performing some other function at the time the sudden and unexpected stress is applied. The mechanical injury of the tissues results from the application of force. A force can be defined as "that which changes or tends to change the state of rest or uniform motion of the body." The force that determines the mechanical injury may be a moving object that changes the state of rest of the tissue, or it may be a mechanism in which the uniform motion of the tissue is changed by meeting a resistance. Moritz[3] has stated that "change of state of rest or uniform motion of the body by which most acute injuries are produced is initiated by impact. The body either strikes or is struck by some object."

Several physical factors are important determinants of the amount of force or impact applied to the tissues.[3] First, the rate at which the tissue

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is accelerated or decelerated is an important factor in determining wound production. Two examples of the mechanism in decreasing the force by slowing the rate can be obtained from the field of sports. Thus, the experienced baseball player decelerating the ball as he draws back his hand in catching the ball reduces a force that could fracture the bones of the hand and cause contusions if it were not properly decelerated. Another example pertains to the boxer who is taught to "roll with the punches," thus slowing the rate of impact. Thus, if the kinetic energy is discharged slowly enough it fails to produce an injury. Moritz[3] has stated that perfectly coordinated muscular opposition probably effects the greatest protection against injury by impact, but unless the muscular coordination is excellent, the next best protection is a state of complete relaxation.

In addition to the rate of discharge of energy, other important factors involved in producing an injury are the amount of force or total energy discharged, and the size of the area through which the energy is propagated. The potential destructive force would be expressed by a physicist in terms of foot-pounds per square inch. Thus, the smaller the area through which the energy is discharged, the greater its potential destructiveness. It is well known that the energy of impact may be transmitted safely through delicate tissues and still may cause extensive damage to a relatively strong tissue, because the mechnical forces have been focused and intensified at some point of mechanical disadvantage.

Another factor relative to acute trauma is the influence of differences in plasticity of the tissues through which the energy is conducted. For instance, the blood vessels of the subcutaneous fat are usually less plastic than those of the epidermis, and therefore more likely to be lacerated by sudden forceful application of energy. Bones are less plastic than soft tissue, and it is well known that fractures often occur with no apparent injury to skin or subcutaneous tissues.

PATHOLOGY AND REPAIR

The basic pathology of sprains and strains and the process of repair that takes place can be considered to involve a number of characteristic stages that are generally applicable to any injured tissue. Thorndike[4] lists four stages: (1) tearing of tissue and concomitant hemorrhage, (2) hematoma formation, (3) hematoma absorption and (4) healing by fibroblastic proliferation.

Moritz[3] describes in greater detail the reaction of the body tissues to injury, although his descriptions can be correlated with the four basic stages outlined by Thorndike. The fundamental pathologic response is based on the reaction of living tissues to the presence of injured or dead cells. It is well known that damaged cells give rise to irritating substances, which stimulate a series of reactive changes in adjacent cells and blood vessels. The changes constitute the phenomenon known as "aseptic inflammation."

Initial Vascular Reaction.—This consists of dilatation of the capillaries with a certain amount of stasis of blood in them. This reaction is considered to be due in part to a histaminelike substance, or "H" substance, that is liberated from the injured cells. In addition to dilatation of the capillaries, there is increased permeability followed by exudation of plasma, cells, and fibrinogen into the tissues.

Edema and Exudation.—The edema or swelling is in part an active process due to the changes of permeability with an outpouring of fluids into the tissues. The edema also is in part passive owing to blockage of the afferent lymphatics by plugging with fibrin. The severity of the edema in part tends to be proportional to the extent of the lymphatic obstruction. During this process there is a margination of the white blood cells whereby they line the capillaries from which they can then migrate more easily than normally through the capillary walls into the perivascular tissues.

Emigrated and Extravasated White Blood Cells.—Although the red blood cells and some of the extravasated white cells tend to act as irritating foreign substances that enter the tissue during the initial hematoma formation or hemorrhagic stage, some of the monocytes and lymphocytes, as Moritz has pointed out, remain in the area and actually take part in the repair reaction. After the first 12 hours, metamorphosis of the monocytes into fibroblasts begins. The pH of the tissue tends to change toward the acid side and this in part seems to increase the mononuclear elements in the tissues. The exudation usually reaches its height within 48 hours, and often even sooner in mild injury.

Repair.—Repair is essentially a proliferative phenomenon. Fibroblasts multiply, new blood vessels form, with proliferation of endothelium, and new vascular buds actually develop in the traumatized tissues. Vascularized granulation tissue develops. This repair process is thought by some to be in response to substances that stimulate growth and repair and have been called "necrohormones," which are liberated by the damaged cells and by leukocytes. The fibroblasts produce collagen which, through a breakdown by physical and chemical agents, produces

elastin. The newly formed connective tissue gradually becomes more compact and tends to contract, and collagen, elastin, and reticulin are formed and the vascular spaces become obliterated.

Cicatrization.—For a considerable time after injury the hematoma or blood clot, the newly formed connective tissue, and the extravasated elements distend and fill the defect. If there is considerable extravasated blood in the tissues, repair may require several weeks. The clot is gradually absorbed and the new connective tissue contracts to form a scar. The greater the defect the greater will be the distortion caused by regression of the repair tissue. The persistence of scar tissue is dependent also in part on the capacity of the specific tissues to regenerate. Ligamentous tissue has poor powers of regeneration and the defect of a sprain is replaced primarily by fibrous scar tissue. On the other hand, muscle tissue that is traumatized by strain has considerable power of regeneration, and unless the tear is extremely large, essentially normal-functioning muscle structure may develop. In the healing of injured muscle, as Moritz has pointed out, injured cells lose their cross striations and nuclei early after injury, and within 12 hours may appear as a hyaline mass. Three days after contusion or other injury, muscle regeneration usually is apparent. Regenerating muscle cells may not mature normally, but tend to form irregularly shaped multinucleated structures. Proliferation of intermuscular fibroblasts is usually prominent within 48 hours after injury. In some cases an intermuscular hematoma is likely to organize, become encapsulated, and thus constitute a permanent lesion.

Some connective tissue organizing in a hematoma may undergo osseous metaplasia with the production of a lesion called "myositis ossificans." If the injury is near the insertion of the muscle, the metaplastic bone may unite with the osseous spurs which often extend into the insertion of the muscle. Foreign-body reaction around a hematoma in muscle or a mass of metaplastic bone in muscle may lead to increasing functional impairment. Thorndike[4] has pointed out that fibrous-tissue repair in ligamentous, muscle, or tendinous tissue results in weakening of this particular tissue, and therefore a tendency to recurrence of the sprain or strain remains.

INCIDENCE

The acute trauma associated with modern transportation, industry, sports, and even normal home life results in uncounted sprains and strains annually. Any notion of the exact incidence of these injuries is impossible to determine, since many instances of minor trauma to joints, ligaments, muscles, and fascia are never seen by a physician. Even so, these lesions make up a significant percentage of the injuries seen in the general practitioner's office, the hospital emergency room, and the medical departments concerned with athletic injuries at colleges and universities. Let us consider something less morbid than the statistics on automobile accidents. Table 1, which shows the incidence of athletic injuries at Harvard over a number of years, indicates the extremely high incidence of sprains and strains. Sprains involving the ankle, knee, and wrist were the most common type. The most common single ligament involved was the anterior tibiofibular ligament of the ankle, with the incidence running 3 to 1 over sprains of the lateral collateral ligament. The duration of the disability, of course, is of vital concern, not only to the coach and players in the field of athletics, but also to the patient regardless of his field of activity. Some indication of the duration of the disability from sprains of the ankle and knee due to football injuries is given in table 2.

The acute pain associated with the onset of a sprain may be transient if only minor stretching of the ligaments occurs. In more severe tearing of a ligament the pain may be persistent, although frequently during the first half-hour after injury it may be minimal. Both the ligamentous structures and the periosteal structures to which the ligaments are attached are sensitive to the pain of stretching and tearing. The severity of the pain depends in part on the site and the extent of damage. A sprained ligament that is essentially subcutaneous will characteristically present a sharply localized pain which provides a helpful aid in determining exactly the involved ligament. Involvement of deeper ligaments may result in more diffuse pain, and often the pain is referred to a point or area some distance from the site of the involved ligament.

In strains, which include pulls, tears, or ruptures of muscle, the lesion may occur anywhere from the origin to the insertion of the muscle. Thus, the site of the pain depends on the site of the lesion. Strains most commonly involve the plantaris muscle, a portion of the quadriceps femoris mechanism, the rotator cuff of the shoulder, the supraspinatus, the hamstrings, the biceps brachii, and the heel cord. In general, besides the fact that acute pain occurs at the site of the strain, the function of the involved muscles is lost immediately and completely. The lesion is best localized by noting the site of the pain and testing for loss of function of the muscles in-

TABLE I

INCIDENCE OF ATHLETIC INJURIES, HARVARD, 1932-1954*

Sprains	1,702
Strains	944
Contusions of joints	448
Contusions of muscles	1,065
Simple contusions	596
Fractures and dislocations	788
Lacerations and abrasions	424
Inflammation and infection	554
Internal injuries	363
Miscellaneous	510
Total	7,394

* Modified from Thorndike.

volved. In strain the localized tenderness may be present only immediately after injury and very soon it becomes more diffuse as associated muscle spasm and swelling occur. In addition to the tear in the muscle itself the deep fascia may be involved, so that herniation of a portion of the muscle may occur.

TREATMENT

Some 25 years ago, Leriche (cited by Thorndike[4]) and others introduced what was at that time a new and radical concept of treatment for sprains. Leriche expressed the belief that the pain of sprain was due to injury of the areolar tissue and nerves about the ligament and joint capsule. Treatment consisted of the immediate injection of procaine directly into the area involved in the sprain and then permitting or even encouraging the patient immediately to resume weight-bearing activities or, if it were an athletic injury, to return to participation in sports. It has gradually been shown that this was not a physiologic form of treatment and that in most instances when used in the treatment of anything but the most minor sprain it would result in more severe damage and a greater incidence of permanent disability in the affected area than when more conservative treatment was used.

It is now generally accepted that the immediate treatment of an acute sprain includes the application of cold either in the form of ice packs or soaking the part in cold water for one-half to 2 hours. Then a pressure bandage is applied usually in the form of sponge rubber and supported by elastic bandaging or wrapping and the part is elevated for 24 hours. By some physicians and in some instances, immediate taping of the area is considered the treatment of choice.

Generally it is considered impossible to evaluate accurately the extent of a sprain or a strain until 24 hours have elapsed following the injury.

TABLE 2

SPRAINS OF THE ANKLE AND KNEE *

Football Injuries	1946-47	1953-54
Ankle sprains	26	6
Days of disability		
Total	226	80
Average	8.69	13.3
Knee sprains	18	12
Days of disability		
Total	244	145
Average	13.5	12.08

* Modified from Thorndike.

At that time the physician can determine more accurately the structures that are involved and the extent of the ligamentous and associated soft tissue injury. In minor sprains of the ankle it is considered sufficient to depend on taping or other forms of elastic support plus the use of crutches while healing is taking place. In more severe strains, accepted treatment now consists of the application of a plaster cast with a walking heel, which is generally worn for 10 days to 3 weeks. During the period of healing and repair of a properly treated sprain, pain is rarely a problem or major issue. In the less severe sprains that do not require a cast, physical therapy in the form of whirlpool baths, contrast baths, light massage, and mild active exercise can be started 3 or 4 days after the sprain. When healing appears to be complete as evidenced by normal stability of the joint, good strength in the muscle and no pain on normal movement of the joint, weight bearing can be resumed and more strenuous exercises and activities gradually undertaken. When strenuous sports activity is resumed, protective wrapping to prevent recurrence should be continued for a year as recommended by Quigley[5] and others.

In the immediate treatment of strain, cold applications and pressure bandaging should likewise be used. The muscle involved should be put in a position of rest and, in some cases, splinted perhaps. If there has been complete rupture of a muscle such as the supraspinatus, the rotator cuff of the shoulder or the quadriceps mechanism, or complete rupture of one of the collateral ligaments of the knee, surgical repair may be indicated as an essential part of the relatively early treatment. If there is a question of partial tear versus complete rupture, usually little is lost by attempting to obtain primary repair by conservative treatment during a period of splinting and physical therapy. After healing or repair of either a sprain or a strain, a most essential part of the late examination, and one that is often neglected, is a complete and careful evaluation of

the muscle strength of the involved muscle and of the other muscles about the affected joint. Wherever residual weakness is detected, treatment should include the prescription of specific progressive resistance exercises for muscle strengthening, to be continued until normal strength has been developed. If healing has not been adequate or all that could be desired, the patient is subject to chronic and recurrent strains, with pain and traumatic arthritis developing. These patients usually benefit by orthopedic surgical procedures designed to provide stronger supports and better stability.

WHIPLASH INJURIES

During the last 15 years the term "whiplash injury" has become popularized in medical literature, lay writing, and medicolegal fields. The term has become controversial, and many physicians are critical of its use and its implications and connotations. The mechanism involved has been described many times and is well known.[6, 7] Frequently the pain problems associated with whiplash injuries are much more complex than in sprains in other parts of the body. The exact pathology is less well known, as the majority of patients with whiplash injury recover without surgical treatment, and there are no positive X-ray findings of bone or joint damage and, of course, no postmortem examination. The ligaments probably involved, as a primary source of the pathology, may be situated in any part of the cervical spine: they may be anterior or posterior; they may be situated close to the nerve roots, the vertebral artery or the sympathetic system; they may be limited to either the upper part or the lower part of the neck; or they may represent almost the entire cervical region. Feinstein and coworkers,[8] using the technics of Kelgren and Lewis, have shown that radicular pain, or the pain that can be reproduced by the injection of 6 per cent saline solution into the cervical interspinous ligaments, paravertebral muscles or other deep somatic structures, may have a rather wide and even distant pattern of reference and distribution.

Certain observations on the symptomatology and findings in whiplash injury are of interest to the physician and the therapist and should be restated here.

1. Immediately after the accident, pain and limitation of motion may be absent or only minimal. However, during the period 6 to 48 hours after the accident, pain gradually develops and marked limitation of motion becomes apparent.

2. The pain may be poorly localized, often being described primarily as a headache either in the occipital or the parietal area. It may be described as a deep cervical pain, or it may be located as low as the scapular area, the shoulder, or the anterior region of the chest. The cervical muscles may become diffusely tender, may be in spasm, and are resistant to either active or passive attempts to move the cervical spine. The head tends to be held in a slightly flexed and rigid or semirigid position. The trunk is turned when the patient attempts to look to the side. In general, all movements and jarring exaggerate the pain.

3. Usually, X-ray examination gives negative results except for loss of normal cervical lordosis; and neurologic signs of weakness, paralysis, or sensory loss are absent.

4. A whiplash injury may cause existing asymptomatic degenerative disease of the joints in the cervical spine to become symptomatic, so that persistence of symptoms may be due more to underlying degenerative disease than to the whiplash injury.

5. In a small percentage of patients, actual protrusion or extrusion of a cervical disk may develop and require surgical treatment.

6. In the small percentage of patients whose symptoms last longer than 4 to 6 weeks it becomes extremely difficult to differentiate objectively the organic components of the pain from the functional components or from the functional overlay, which in some instances apparently becomes the predominant factor. Varying degrees of depression, anxiety, and fixation appear relative to the persistent symptoms.

Questions that are often extremely difficult for the physician to answer are then raised. Is there scarring of the nerve root? Has the size of the foramen been compromised? Is degeneration of a cervical disk developing? Have the joints of Luschka been injured and are they contributing to the pain and disability? Are surgical exploration and fusion indicated? Is psychiatric evaluation indicated? When should the compensation aspects be settled? How long should physical therapy be continued?

Treatment.—The principles applicable to the treatment of sprains in other portions of the body should be applied for the treatment of sprains of the cervical spine.

Adequate support, for rest and protection of the neck during the first few days to several weeks, may be provided for by one of the several cervical collars available. These range from simple felt collars to rather elaborate and expensive orthopedic appliances with chin rests, occipital supports, and adjustable uprights. Liberal use of analgesic drugs may be required at first. The muscle spasm and soreness may be treated with

physical therapy 2 to 3 days after injury, and the patient can be encouraged in gentle active motion. In some instances, training the patient to contract and actually voluntarily relax the muscle, still in spasm, may be useful.

Since the primary lesion is considered to involve ligamentous structures of the cervical spine, and since these are at considerable depth from the surface, one of the several forms of diathermy may be the most helpful source of heat for use during the first 2 or 3 weeks after the accident. Of course, it is permissible and also sometimes useful to apply one of the more superficial forms of heat, particularly when pain due to secondary muscle spasm has become prominent in the symptomatology. The use of hot moist packs and the use of heat lamps have been found satisfactory by many physicians prescribing for these patients.

One or two weeks after injury, particularly in patients who continue to have symptoms suggestive of radicular involvement, mild traction may be instituted. In perusing the literature one can find that there are proponents of almost every type of traction that is available. Some prefer manual traction; others mechanical; some continuous traction; others intermittent; some vertical; others horizontal traction. My colleagues and I tend to prefer simple vertical traction for a period of 2 to 3 minutes, given twice daily by means of the Sayre sling. In this way we have good control of the amount of traction used, generally between 30 and 60 pounds, and we can observe and palpate the muscular response to the traction in the cervical region. After a period of 2 to 4 weeks, when it can be assumed that the ligamentous structures and associated muscle strain may be fairly well healed, the amount of exercise may be gradually increased and the patient encouraged to leave off the cervical support for longer periods during the day.

One of the greatest problems in the treatment of prolonged and persistent pain, lasting months after whiplash injury, is due to the fact that some of the patients have been permitted or even encouraged to wear the cervical spinal support continuously over a period of many weeks or months. In these patients, motion of the cervical spine may become markedly restricted and guarded in all planes, and pronounced muscle weakness and atrophy from disuse plus tenderness and hypersensitivity of the muscles may become obvious physical findings. It is well known that in a small percentage of these cases some cervical symptoms persist for months and even years. Even if these represent less than 5 per cent of the estimated 187,500[6] whiplash injuries occurring annually, the some 9,500 such patients per year are potential problem patients for the physician and therapist. In some instances these complaints appear to be primarily functional. However, all of us have seen the occasional patient who does not have the personality associated with those who usually present functional complaints. Likewise, some of these patients do not manifest improvement after the compensation aspects of the case have been settled.

In physical therapy for chronic and persistent symptoms, obviously various forms of such therapy should be adequately tried. More important than selection of the type of heat used or the massage given is the proper prescription and application of exercises to maintain or improve the strength of the cervical and shoulder-girdle muscles. In addition, efforts to help the patient to assume again the normal postural alinement of the cervical spine are important. In some cases it becomes habitual to hold the neck forward and slightly flexed with the head protruding, much like an expectant turtle. The effectiveness of the long list of relaxant drugs introduced in the last few years has been disappointing in these patients having whiplash injuries.

Some patients with persistent symptoms eventually undergo a surgical procedure. Most common is exploration for protruded or extruded disk. Certain cervical nerve roots may be decompressed when indicated. Some patients may require fusion of a portion of the cervical spine. These operations should not be undertaken lightly or before all efforts at conservative treatment have been used over a relatively long period unless, of course, progressive neurologic signs are developing.

In the following presentation of several case reports, some specific points mentioned here will be emphasized further and will actually be illustrated by the problems seen in the physician's office and the physical therapy department.

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(First Case History follows on next page)

First Case History

Cervical Strain

Robert Maul, B.S.

History

A patient male, age 56 years, was brought to the emergency room on Oct. 24, 1958, for treatment of his head, neck, and thoracic area. Investigation revealed that he had stopped his car at a traffic light and that another vehicle had hit the rear of his car. According to the patient, the force of the impact jarred his hat onto the rear seat of his car. His chief complaints were severe headaches, pain and tenderness of the musculature of the posterior neck and shoulder girdle area, at the base of the skull especially, with "tingling and numbness" of his fingers and posterior aspect of his humerus. He was given a sedative and put on bed rest but was allowed to be taken home. He was told to take aspirin and use the heating pad for pain till he could be seen the next day in the physician's office. The X rays showed some osteoarthritis with "lipping" at C5 and C6. Three days after the initial visit to the physician's office, a Thomas collar was put on the patient because of his inability to hold his head upright when either in a sitting or standing position. The symptoms of pain were still the same as on the first examination.

Physical examination

On November 4, he was sent to the physical therapy department for steam packs to his neck and upper thoracic area, massage, and active exercises. He held his neck rigidly and turned his entire body when he looked from side to side. He had marked joint limitation in all ranges except lateral flexion which could be performed through 20 degrees bilaterally. He could be given only light massage because of extreme tenderness in the nuchal and rhomboid areas on the right and between the spine and superior medial angle of the scapula. He also complained of dizziness after treatment and was made to sit and stand for short periods before walking. He was instructed on a postural program to try to avoid further irritation and was cautioned not to drive or ride in any vehicle except to and from the hospital.

Hospital course

The treatment for the first week had to be altered because often the patient would not tolerate either the massage or exercises as he said it intensified the radiating pain down his arm or started severe headaches. The doctor advised us to find the treatment modalities that seemed to get the best results.

On November 11, he developed a severe pain in the right axillary and triceps areas. He was referred to a neurosurgeon for consultation. X rays were taken but they were reported negative. At this time it was also noted that he seemed to have mild atrophy of the intrinsic muscles of the right hand. In the next four weeks of treatment the pain in the left side of the neck and back diminished and he complained of the severe pain only on the right side. Mild intermittent cervical traction was started (12 pounds at 2-5 minutes in supine position) but it had to be stopped for 1-2 day intervals because he complained of headaches and dizziness afterwards. This treatment was continued for five more weeks with mild improvement.

After seeing him on Jan. 9, 1959, the doctor thought it advisable to admit him to the hospital for bed rest and physical therapy twice daily. He was admitted on January 12, and 5 pounds of continuous traction was applied. Ranges of motion in his neck were 30 degrees lateral flexion, 35 degrees rotation, and 30 degrees neck flexion. Symptoms were still the same on the right side of the neck, shoulder, and upper extremity. After a week it was felt that he was not progressing enough to be kept as a hospital patient so he was sent home and resumed treatment as an outpatient.

On February 25, after daily treatment did not seem to help, he was again referred to the neurosurgeon, who found no evidence of nerve root pressure and recommended that physical therapy be continued. Mild active shoulder exercises were started on March 2, as the patient had not used his shoulder because of the pain it caused in his neck. Range of motion of the shoulder was normal except that he lacked 40 degrees of external rotation. He started incoordinated shoulder movements when asked to move the shoulder, as he said it created pain in the right side of his neck. Treatments were continued daily and on March 17, all shoulder ranges were normal and motion was coordinated. The patient still had a mild limitation in all neck movements to the right and still complained of radiating pain in his arm posteriorly, at the base of the skull on right side, and in the rhomboid area, with tingling and some numbness in his fingers. Eighteen pounds of intermittent cervical traction (10 minutes on—3 minutes off) for one hour was ordered to be given three times daily. He was still very sensitive to light massage of the rhomboid area and it was recommended that ultrasound be given over the most sensitive area. We started with .5 watts/cm2 for 5 minutes over the right rhomboid muscle and increased it gradually over 10 treatments to 2 watts/cm2 for 15 minutes. No progress was noted. In order to strengthen the involved muscles, the physician ordered an active resistive exercise program for the shoulder girdle muscles which was started on March 30. Home traction was discon-

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tinued at this time as it increased the headaches and dizziness.

At the next appointment with the doctor, April 7, the cervical collar was removed and he was told to use it only when driving. Treatments were reduced to 3 times weekly. He also used a 3 pound iron dumbbell for mild resistance during shoulder exercises. No improvement was seen in the next two weeks. The doctor thought it advisable to use hot packs for 20 minutes followed by ethyl chloride spray over the tender areas, then range of motion with assistance. After one week of treatments, his neck range was nearly normal, supine lying, but the patient still had the same pain at the nuchal and rhomboid areas. In the standing position he still had the habit of turning his trunk instead of his neck.

He was referred to an orthopedic surgeon April 24. Again X rays were taken of the neck and upper thoracic area, because of the continued diffused tenderness over the cervical region, particularly over the occipital attachments on the right. They showed essentially no change from previous studies. Neurological examination at this time was considered normal. The orthopedist's diagnosis was cervical spondylopathy secondary to sprain superimposed upon preexisting degenerative joint disease. He recommended that physical therapy be continued.

On May 24, the range of neck motion was normal except for approximately 5 degrees rotation to the right side only. The painful areas were no longer sensitive and the doctor released him to return to his job.

In conclusion, it can be stated that even though physical therapy was started early, and conservative measures were used, the slightest provocation seemed to aggravate the patient's condition and prolong his disability. Even though no evidence of nerve root pressure was found, this case gave rise to confusing symptoms. Each case is somewhat different and treatment should be individualized.

Second Case History

Whiplash Injury

Leo J. Morrissey, B.S.

An ever increasing medical problem to the physician and the physical therapist is the whiplash injury to the neck. The orthopedist, neurologist, and the general practitioner are treating, in their offices or through physical therapists, large numbers of these patients following injury to the soft tissue of the cervical area.

The term "whiplash" is, medically speaking, a poor one. It is not definite enough, giving little information diagnostically. Many practitioners are discouraging its use and in its place are using more proper terms such as myocervical strain, myofacial cervical strain, and/or myocervical syndrome.

In recent years the myocervical strain (whiplash injury) has gained widespread attention because of the medicolegal aspect involving insurance claims, compensation claims, and the like. The myocervical injury, generally speaking, is not the prolonged disabling injury that the public has been led to believe. It should not be the medicolegal whipping post that it has been and still is in some quarters. Rather, it should be regarded in its proper perspective, as an acute strain which can be remedied by proper and early medical attention.

This report is based on a survey of 236 patients referred to the Department of Physical Therapy, Mercy Hospital, Cedar Rapids, Iowa, diagnosed as having either myocervical strain, myocervical syndrome, or whiplash injury.

In this survey the etiologies of myocervical strains have been divided into four groups.

1. Injury received from automobile accidents.
2. Injury received while at work.
3. Injury received while engaged in sports activities.
4. Symptoms without known cause.

With the increase in the number, size, and power of automobiles, the incidence of accidents is on the upswing. In 1957, over 40,000 persons were killed in automobile accidents; 1,250,000 were injured, of which 187,500 received whiplash or myocervical injuries. This group represents approximately 15 per cent of the injured. The whiplash injury occurs when a standing or slow moving vehicle is struck from the rear or side. Very few such injuries result from head-on collisions because the victim is generally prepared to some degree for the impact.

When struck from the rear the head and neck, because of inertia, fly back and then forward. Hyperextension is followed by hyperflexion. The patient experiences a sharp "snap" followed by a burning sensation. His hat may fly to the rear of the car and the car seat may break loose from its mounting, depending upon the degree of force. He may feel immediate pain which may be temporary and may diminish only to return with increased severity several hours later. Results of treatment of this group will be discussed in the case report.

The second most common cause is injury at work, which may result from falls, blows about the head, neck, and shoulders and after bizarre traumatic accidents. The symptoms are the same as those resulting from automobile accidents—in vary-

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ing degrees, depending on the force of the trauma.

Sports activities produce another large group of patients with myocervical strains. This type of injury is most prevalent in contact sports where the player is hit unexpectedly and is not prepared for the blow. It occurs most frequently among football players who have their necks thrust into hyperflexion or hyperextension. However, it is not unusual to see myocervical injury among competitors of such sports activities as swimming, golf, and tennis.

Symptoms of myocervical syndrome are prevalent although patients may give no history of recent injury. Hypertrophic spurring of the vertebrae and/or narrowing of the intervertebral disk spaces, acute myositis or fibrositis of the cervical musculature, cervical ribs, and "tension" necks due largely to occupational hazards and/or environmental conditions are productive of symptoms in this group of patients.

The symptoms of myocervical strain are remarkably similar in all four types of patients. The most common of these are neck and shoulder pain, and headache. Headache is usually confined to the occipital area but often involves temporal or parietal regions. It may be constant or occur in sharp twinges. Pain, paresthesia, weakness, and sensory changes in the upperarm, forearm, and hand in varying degrees are also common symptoms.

Physical findings usually include tense cervical musculature with limitation of motion of the neck in one or all planes, tenderness in the area of the brachial plexus, and spasm of the cervical muscles and accompanying groups.

X-ray findings are usually essentially negative; although frequently they show evidence of degenerative disease which may prolong the symptoms of the myocervical strain.

Physical therapy procedures, in the treatment of myocervical strain, vary somewhat with the referring physician's experience. Physicians, however, normally agree, in general, with the application of heat, either hot packs or diathermy; ultra sound; massage for relaxation of the involved muscles; and the application of cervical traction, either intermittent or constant, at a given amount of pull varying with the size of the patient and the acuteness of the symptoms.

In observing the results of the treatment of the 236 patients in this survey it was noted that the patients who were treated early after injury responded more rapidly to treatment than those who did not report to their physicians until the symptoms became somewhat chronic. This would tend to emphasize the importance of receiving proper care as soon as the symptoms appear.

It also points out the importance of proper examination and diagnostic procedures prior to prescribed treatment. It is in this area that the cultist often gets the patient, as well as himself, into trouble by administering a radical type of treatment, such as manipulation, to correct something which in his terms is "out of place."

The following is a case report of a typical sequence of events of a whiplash injury.

A 33 year old female on Feb. 25, 1959, was stopped in a line of traffic and was hit from behind by another car which forced her car into the automobile ahead of her. Her neck was "snapped back" and she felt immediate neck pain and numbness in both upper extremities which persisted for from 20 to 30 minutes. This pain and numbness seemed to subside and the patient felt better except for a slight headache in the occipital region.

On the following day the patient reported to her physician's office with the complaint of a sore neck and a feeling as though her right arm were asleep with radiating pain from her shoulder area. She also stated that the grip in her right hand felt weak. Following consultation with her physician, the patient was instructed to report to the hospital for admission.

Physical examination

Upon admission the physical examination revealed a patient in acute distress from a myocervical injury. The cervical area was tender to touch both posteriorly and laterally. There was limitation of motion of the neck, spasm of the neck musculature and in the area around the brachial plexus and the upper fibers of the trapezius muscle on the right. The strength of the grip of the right hand was diminished and was about one half of that of the left. It was noted that the patient was right-handed. The remaining neurological examination was essentially negative with no abnormal reflexes present. The sensations of the right upper extremity were intact. Definite pain was present on flexion, extension, and lateral movements of the neck.

Roentgenology

On February 26, routine views of the cervical spine including an open-mouth view of the upper cervical vertebrae and a lateral view in anterior flexion showed no evidence of recent injury or disease. Anteroposterior and lateral views to the thoracic spine and a special oblique of the upper thoracic vertebrae showed a minimal degenerative spurring of the anterior articular surfaces of the upper vertebral bodies. There was no evidence of recent bone injury or disease. The radiologist's conclusion was a minimal degree of degenerative disease of the upper thoracic spine.

Hospital course

The patient was referred to the physical therapy department for treatment on February 26, with a diagnosis of acute myocervical strain. The orders from the referring physician included application of hot packs to the cervical and right shoulder area, massage to the cervical and upper thoracic areas, and the application of intermittent cervical traction at 15 pounds of pull for a 20 minute period. This order was for treatment twice daily.

On the third hospital day there appeared to be little improvement except that the patient "felt better" for an hour or so following the physical therapy procedures. At this time a conference was held with the referring physician and the course of treatment was changed to the application of hot packs to the patient in bed in her room. An intermittent traction device was moved into the patient's room and applied. The orders were for the patient to remain quiet in bed with application of hot packs to the cervical area and the traction device to be used for only half hour periods with from 15 to 20 pounds of pull three times a day. Visits to the physical therapy department were reduced to once daily and the orders were changed to the application of diathermy to the cervical area, the right shoulder, and upper arm.

The patient improved steadily under this program and on the sixth hospital day the intermittent traction was removed in favor of constant traction at 7 pounds. The patient at this time was placed in Fowler's position. The patient was allowed out of bed and up in a chair for short periods.

On the ninth hospital day traction was discontinued and the patient resumed daily visits to the physical therapy department for application of hot packs and gentle massage to the cervical, thoracic, and right shoulder area. At this time the majority of symptoms had subsided except for mild headache which was not present at all times.

Physical therapy procedures were discontinued on the twelfth hospital day and the patient was discharged the following morning, March 10, 1959, as markedly improved.

This case report is presented as one approach to the management of myocervical strain using conservative methods which, in the opinion of this reporter, serves to illustrate the proper use of professional physical therapy.

Third Case History

Radiculitis

Anne Pascasio, M.Ed.

A 36 year old female was sent to our Department of Physical Medicine and Rehabilitation on Aug. 13, 1956. In January of that year, she had been riding in a taxi cab which was struck from the rear by a trolley. At this time she had been taken to a local hospital where she had been treated by horizontal cervical traction with 6 pounds of weight for two weeks. The patient felt that this treatment had not relieved her pain.

Examination by the physician at the time of her first visit to us showed spasm of the right trapezius muscle and extensor muscles of the back of the neck. There was a definite area of tenderness and slight limitation of forward neck flexion. At this time a lump approximately 1 inch in diameter was palpated in the trapezius muscle and the patient, who was a waitress, complained that lifting heavy trays of food and dishes made the swelling worse. She also complained of pain radiating from the neck into the right shoulder and occasionally up the back of her head. No sensory changes were detected.

Diagnosis was made of radiculitis due to forced neck extension. The treatment which was prescribed consisted of infrared and gentle friction massage to the right cervical and upper paravertebral muscles to be followed by intermittent cervical traction. This traction was applied in a sitting position for a total of 15 minutes with an alternating upward pull of 30 pounds for 8 seconds and relaxation for 4 seconds. This program was instituted on a basis of three times a week.

During the course of treatments, many changes were made in these original orders. After the first four treatments, the patient began to complain of pain during traction. This was the first change; traction was omitted. After a few days, microwave was substituted for infrared.

The next time the patient returned she was seen again by the physician and the prescription was again changed. Now she received hot packs, ultrasound (1 watt/cm.^{2} for 5 minutes) and massage to the neck area on the right and upper back. The pain persisted, however, and five treatments later, the prescription read "shortwave diathermy followed by galvanic stimulation to the right trapezius muscle." Soon the patient suggested that she thought she might return to work and after four more treatments, she did so. It was thought that gradual improvement would continue and that complete cessation of symptoms would appear during the coming weeks.

In February, 1957, (this was six months after the first visit) the patient returned to the department with the original complaints and told us she was not able to work. It was still possible (or again possible) to palpate the lump in the trapezius. Neck flexion was still limited. Hot packs followed by simultaneous ultrasound and electrical muscle stimulation over the muscles of the tender area were prescribed. After a few times, the patient discontinued treatment of her own accord.

The pain and tenderness over the right trapezius muscle and the extensor muscles of the neck seemed to persist for in September, 1957, her original physician sent her back to be reevaluated and for additional treatment. Neck flexion was limited

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slightly and the swelling was still present. We started again with infrared, ultrasound, intermittent cervical traction, and postural upper back exercises. Shortly thereafter, the patient complained of constant headaches, and was sent again for a roentgen examination of the skull and an eye examination. Both of these reports were negative. No ocular evidence of any intracranial disease was found and there was no bony damage to the skull.

About a month after this, it was noted that swelling of the lump in the trapezius had decreased slightly and that head rotation and forward neck flexion were almost normal. The patient stated that the pain in the trapezius muscle remained. Infrared followed by ultrasound and massage was given to the painful areas and upper back. She came for only two treatments.

On May 8, 1958, the patient returned to tell us of pain in her head and neck. The doctor noted that a lump was no longer palpable and that no neurological signs were present. He advised her to use heat at home. This visit was almost 21 months after the original one.

About a week later, the patient's suit for damages came to jury trial and she was awarded $7,000.00. The patient returned to her original place of employment two days later. Four months after this she returned to the department. She wished to begin a new job and needed a signed statement from the doctor saying that she was capable of doing so. He signed one stating that in his opinion she had no more residual effects from the injury and that she was completely capable of returning to work.

Suggestions from the Field

A Teaching Device for the Ataxic Child

Alex Geller, M.S.

This is a simple device that can be made at minimal cost. It has been used in the Cerebral Palsy Clinic at Long Island College Hospital and can be easily duplicated for home exercise and follow-up care by the parents of the children. We have used it for children from 3 to 7 years of age. Its main purpose is to help establish a pattern for foot placement and coordination for ataxic children. Its secondary purpose is to help youngsters in learning to tell time.

We used two film titling boards (green color) and titling numbers (yellow color) to simulate the face of a clock. The reverse sides of the boards were taped together to permit folding; however, the clock can be made from wood, plastic, or linoleum with the numbers painted on with oil or water colors. It does not necessarily have to be made in two sections but can be made from a solid panel.

Two foot patterns, right and left, were cut out of adhesive and pasted to the center of the board. The numbers were adhered clock fashion. The youngster stands on the foot outline and is asked to cover the numbers with either the right or left foot. For example, "Cover No. 3 with the right foot."

Many variations can be substituted for the numbers. Gluing animal pictures, or color wheels in place of the numbers may be of value in stimulating the child's response.

Foot Placement Clock

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Eleanor J. Bader, Wilmington, Del.	1956–1960
Alfred J. Szumski, Richmond, Va.	1958–1961

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Anna L. Sweeley, El Centro, Calif.	1956–1962
Harold Glicklin, Windsor Locks, Conn.	1958–1962
Ivan C. Kline, Jacksonville, Fla.	1958–1964
Alma H. Maga, Flossmoor, Ill.	1958–1964

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Dorothy Baethke, Philadelphia, Pa.	1959–1962
Ruby Decker, Galveston, Texas	1959–1962
Gladdes Neff, Long Beach, Calif.	1958–1960
Beth Phillips, Milwaukee, Wis.	1958–1960
Virginia Wilson, Ann Arbor, Mich.	1958–1961

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Kathryn J. Shaffer, Swampscott, Mass.	1954–1960
Jessie F. Waddell, Lansing, Mich.	1959–1961
Marian Williams, Ph.D., Palo Alto, Calif.	1958–1960
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Advisory Committee on Chapter Activities

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Wayne H. Perdue, Omaha, Neb.	1956-1961
Dorothy Page, Albany, N. Y.	1957–1962
Ellen Smith, St. Petersburg, Fla.	1958–1963
James Zimmerman, Columbus, Ohio	1959–1964

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Thelma Pederson, Norman, Okla.	1958–1963
Beth Phillips, Milwaukee, Wis.	1958–1961
Dorothy Hoag, Denver, Colo.	1958–1960
Marjorie Ionta, N. Weymouth, Mass.	1958–1963

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Daniel Strelnick, Wauwatosa, Wis.	1956–1961
Betty Nichols, Atlanta, Ga.	1959–1962
Marguerite Du Rette, Portland, Ore.	1959–1963
Elizabeth J. Davidson, Harrisburg, Pa.	1959–1964

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Advisory Committee to American Physical Therapy Association Representative to World Confederation for Physical Therapy

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Mary E. Kolb, Leetsdale, Pa.
Mildred Elson, Woburn, Mass.
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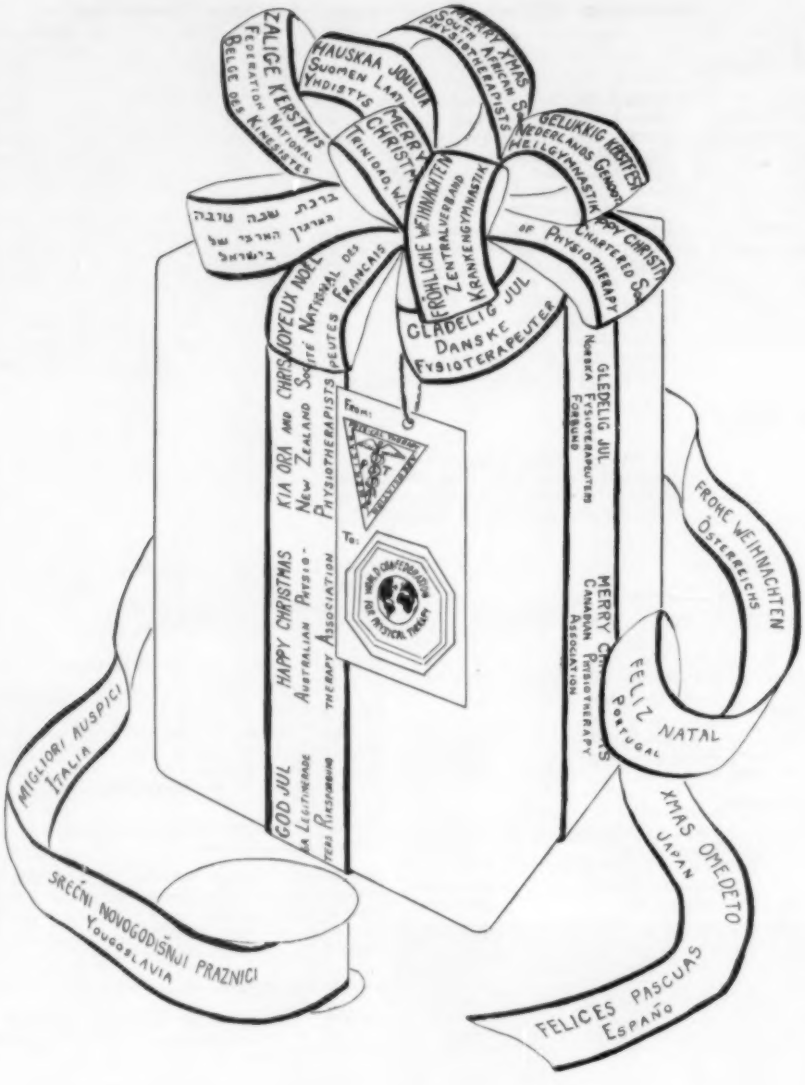
Elizabeth Addoms, Brooklyn, N. Y.
Martha Wroe, Gainesville, Fla.
Lorraine Lake, St. Louis, Mo.
Dorothy Fredrickson, Nashville, Tenn.



To and From All Others

The messages which appear on the Christmas package were gathered during the Third Congress in Paris. We are sorry we failed to obtain similar good wishes from representatives of other countries. We know you join us and all others in wishing physical therapists and everyone around the world the best of everything in the years to come.

WORLD CONFEDERATION FOR PHYSICAL THERAPY *News*

Third President Elected at Third Congress

Mrs. Rudie Agersnap of Copenhagen is the newly elected President of the World Confederation for Physical Therapy and will serve until 1963 when her successor is elected during the Fourth Congress in Copenhagen. Mrs. Agersnap has been a member of the Executive Committee of the WCPT since its Inaugural Meeting in Copenhagen in 1951 having been elected Third Vice President in 1951, reelected in 1953, and made Second Vice President in 1956.

A graduate of H. P. Lunds Kursus (School of Physical Therapy), Copenhagen, in 1932, Mrs. Agersnap has been for many years a part time member of the physical therapy staff at The Kommunehospitalet in Copenhagen. She has served her professional organization, Danske Fysioterapeuter, as a member of its Executive Committee and as Chairman of the Executive Committee, a position which combines the duties of the presidency of the organization and those of an executive director. Mrs. Agersnap also served from 1946-1953 as Editor of the professional journal, *Tidsskrift for Danske Fysioterapeuter.*

The United States is almost 20 times larger than Denmark yet physical therapy services seem to be 10 times more available in Denmark than in the U.S.A. In 1956 there was one physical therapist for every 22,000 persons in the United States, while Denmark had one physical therapist for every 2,200 of its population. Mrs. Agersnap, therefore, brings to the World Confederation many years of valuable experience as a leader in her own country and in the WCPT.

Third Congress Impressions

With 2,100 physical therapists, physicians, and guests registered for the Third Congress of the WCPT in Paris, Sept. 6-12, 1959, 290 members of the APTA represented seven per cent of the total. Attendance from member organizations of countries nearby was, of course, higher than the attendance of APTA members. However, our 290 members travelled a total of more than 2,000,000 miles in order to be present at the Third Congress.

Our group was a conglomerate one—APTA presidents, present and past; several members of the Association's Board of Directors; members of APTA committees, and the *Review's* Editorial Board; chapter presidents; National Office staff; members who contributed to the Congress program; members from the Armed Forces stationed overseas; members from all areas of the United States, some of whom may never have attended one of our Annual Conferences; and members who originally were from other WCPT countries but who are now U.S. citizens.

Our group was undoubtedly the least apt linguistically and was, therefore, very likely the group whose utmost admiration was inspired when at the Banquet Mrs. Rudie Agersnap of Denmark, the newly elected President, gave her greetings in French and English! The language barrier which confronted most APTA members did not dull their enthusiasm for the Third Congress and their visit in Paris. This is testified by the following impressions submitted by several of our members.

Privileged as I have been to attend all the meetings of the WCPT from its founding in 1951 to September 1959, my impression is one of inspiration and satisfaction.

Internationally we share experiences. We realize we all are meeting and attempting to solve the same problems.

Paris offered such a program in a setting of cultural advantages.

For me, the highlight of this Paris Congress was meeting with Miss Eleni Diamandidou of the Hellenic Society for Crippled Children in Athens, who is treating a cerebral palsied child in Athens.

In 1952 I learned of a mother's concern for her 3 year old boy, untreated, carried on a pillow, and still wearing dresses.

Only by letters could I reassure the mother, urge her to make the child less dependent upon

her, and to guide him into as normal a life as possible until a physical therapist could be found.

In 1954 I learned from Virginia Badger, that Miss Diamandidou now a member of the APTA was returning to Athens after taking the P.T. course at U.S.C., Los Angeles.

She reports that Nicolas, now 10 years old, a severe athetoid, is progressing well, does excellent school work, and enjoys interests and play activity with normal children.

EDITH MONRO

The term "compensation movements" was generally used by the Europeans rather than "substitutions" to describe undesirable movements. This seems to convey better meaning without explanation.

The term "reeducation" was used for any therapeutic exercise no matter for what goal the exercise was being used.

From two tours to French clinics in Paris: Greater use of equipment adapted to individual injuries by pulleys and springs to support and position the extremity while assistance or resistance was given the part by attachment to another pulley or spring.

I was deeply impressed by the humbleness and deep sense of honor shown by Mrs. Agersnap as she accepted the Presidency for the coming term.

English was well spoken by many Europeans. I think I should put forth the effort to learn one of their languages.

I enjoyed the "sharp" papers of Miss Hickling (G.B.) and Miss Williams (U.S.A.) and the idea of "Orientation" by Ruth Cook (U.S.A.) Also the universal pleasure shown by the listeners when skill was demonstrated by the patients and therapists in movies, lectures, and demonstrations on the floor.

The comfortable situation at UNESCO for us listeners.

Many women have combined marriage and other careers.

DOROTHY I. GLIDDEN, Capt., AMSC

And Paris couldn't have been finer! The sidewalk cafes are always relaxing and hospitable.

In retrospect, the month was so wonderful I can't believe it happened to me! Personally, the three week holiday preceding the Congress was the most exhilerating I have ever experienced, and the meeting was an appropriately stimulating climax.

I shall never forget the solemnity of the opening session at UNESCO, when the French soldiers in their colorful uniforms and shining helmets formed the guard of honor for the WCPT officers.

The subject matter of the meetings has been well covered, and will soon appear in print; but the camaraderie, the gayety, the professional enthusiasm of 2,000 people from different climates and nations, and speaking different languages, who gathered in Paris to share and exchange ideas and experiences is a thrill that no written commentary could ever capture no matter how skillful the writer!

From the little things, like sharing earphones, or armrests, to the grand, impressive things, like sharing champagne at the reception or the delicious and perfectly served food at the Banquet, the strong bond that united us emphasized wordlessly that international boundaries can never separate the hearts of those who serve the sick and handicapped.

For me it was this rather than the essence of the excellent professional papers that made the Third Congress an important event in my life, and I hope as do all my confreres, that I can climb the highest mountain in Denmark, to see for myself if it is as high as Montmarte!

BERNICE KRUMHANSL

We received so much in so many ways... I think the best of all was meeting old friends, making new ones and the contacts we made with fellow workers from other lands. It was all an inspiring and never-to-be-forgotten experience.

BEATRICE BOZARTH

All I can say is that upon my return from Europe and the Paris Meeting I find myself being forced into the roles of journalist, speaker, and TV artist (offer refused!), which are not particular talents of mine, but who knows? Maybe it's good for me. It seems that a trip such as ours brings added responsibilities so one must rise to the occasion—and the occasions are numerous this month of October.

As for Paris, the Third World Congress and the social events, I loved it all. My only regret is that I seemed lacking in stamina and strength to keep up as well as I wanted to that week. The entire affair was the most strenuous thing I've ever undertaken, and possibly the three weeks of travel preceding the meeting, contributed to my state of fatigue.

Since I am an avid supporter of the United Nations, it was a great opportunity to participate some at UNESCO headquarters, a beautiful place. I found the sessions during the week most in-

teresting, and while there were a few new ideas (to me anyway) presented in physical therapy, I felt at times we are more advanced in some ways than some of our other colleagues. The interpreters are certainly to be commended. I must admit I was quite lonely at times for some of my Iowa gang—and I realize how lacking most of us are in the art of communication with peoples of other countries, but I rather doubt if this fact will goad me into studying another language intensively at this time. I hope the younger generation gets this training. The evening events were most enjoyable—I always get a thrill when attending a large P.T. banquet—especially when one is the recipient of a kiss on both cheeks by a bearded Frenchman. Versailles by night and light I will never forget along with many other events and memories too numerous to mention.

The new Confederation President, Mrs. Rudie Agersnap from Denmark, is charming and brilliant, and I had the feeling as I shed some tears at the closing ceremony that another great World Congress of Physical Therapy will be ours in Copenhagen, 1963.

EDITH D. FRAZIER

Trying to highlight one's attendance at the World Confederation in Paris is almost impossible, for the scientific sessions, social events, and the city itself made for a thrilling experience. But I believe that exploring Paris was my most enjoyable impression. And here also I must praise the physical therapists of France who worked so hard, all week long and the months in preparation, to make the Congress a success. Catering to over 2,000 people is a tremendous responsibility and as our English friends would say, "it was jolly well done."

The 10 days I spent in Paris will always be a wonderful memory. I didn't get excited till I arrived there—and then the excitement seemed to settle around me like a fog. There seemed to be something magic in the air. Perhaps it was the little winding streets, the cathedrals, the hundreds of small sidewalk cafes, the museums, the bookstalls along the Seine River, the restaurants, the beautiful gardens, the entertainment that ranged from opera to risque night spots, or perhaps it was the people of Paris who are polite, warm, tolerant, emotional, democratic, and are never at a loss for words that flow endlessly; but, whatever it was there was plenty of it! Incidentally the French language is based on Latin, but it was and still is "Greek" to me! I used my hands, about as much as I did my mouth, trying to get them to understand me and it still is funny when I think of how I looked with those frantic gestures! My favorite *pastime* was to saunter about the city with no purpose except to enjoy life as it came—and it came!

And, too, I must mention the wonderful feeling of going to the American Church in Paris. It is the oldest American institution in Europe and it gave me a feeling of humility and spiritual inspiration to worship God with fellow Christians. For over a century this church has stood, a notable example of Christian unity.

Yes, I fell in love with Paris, for perhaps no other city is quite so beautiful, exciting, charming, or gay and I look forward to the day that I can revisit it.

With fond memories,
BOB MAUL

Words or pictures never quite express or capture the thrill one experiences in attending a national or international activity—and the Third World Congress for Physical Therapists was no exception.

Can you imagine being lost your very first morning in Paris? I found myself at the NATO instead of the UNESCO building. Only through the aid of a patient gendarme did I reach UNESCO before the end of the A.M. session. And because of my error I had the privilege of a ride with Dr. Geny, one of the speakers at the Congress. Though we did not converse in a common language there was a warm feeling of undestanding.

Can you picture living in a small hotel on the Left Bank with all of 25 rooms in it? Here I met a charming British therapist and her family who also had taken a holiday in Europe while attending the Congress.

How about attending a banquet and finding therapists from Western Germany, Sweden, Australia, and New Zealand at your table? Each sang loudly and proudly when the orchestra played a song of his or her country.

People impressed me most during this week. If groups of people from so many nations can live, work, and socialize so harmoniously for one week, why can't nations do the same forever?

SARA BEDINI

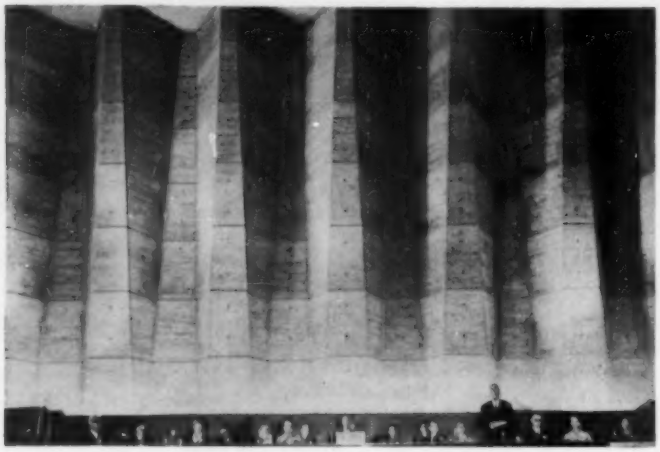
In thinking back over the Third World Congress a kaleidoscope of lovely impressions crosses my mind. It was an occasion filled with excitement from start to finish. The one necessary ingredient to add to the historic charm of Paris was the sincere and enthusiastic professional hos-

pitality we always find among our neighbor physical therapists throughout the family of the World Confederation. It would be hard to imagine a happier situation than mingling with one's colleagues in such inspiring locales as the opening reception at the Louvre, the General Assembly in the UNESCO Building, and our delightful and traditional banquet at the Palais de Chaillot.

Every Congress has served to bring physical therapists of the world closer together. For me the Congress not only emphasized our mutual

(continued on page 826)

High Lights of the Third Congress



Opening Ceremony held at Unesco

Paris—June 1959

M. Bernard Chenot, Minister of Public Health and Population, arrives for Opening Ceremony

Scientific sessions throughout week

President G. V. M. Griffin (G. B.) addressing the Congress during the Opening Ceremony

(Right) First Vice President Mildred Elson (U.S.A.) receiving the Bronze Medal of the City of Paris presented by the President of the Municipal Council of Paris

Executive Committee and guests at the Banquet—Palais de Chaillot. Mrs. Rudie Agersnap (Denmark), Third President of WCPT is seated third from right.

Lt. Col. Agnes P. Snyder, APTA President, shares the Banquet festivities.

(Left) Sunday evening reception at the Musée du Louvre

(Right) Opéra de Paris

professional interests, but other common bonds such as we found when 14 P.T. Soroptimists from 4 different countries found time to enjoy luncheon together. Surely the French Committee merits the congratulations of us all for the large task it carried out so well including the arrangements for simultaneous translation of scientific papers. Whether or not it was specifically planned a noteworthy theme was repeated in many papers—teamwork. Certainly that is the only future for our profession, the World Confederation, and the people on our planet.

GLADDES NEFF

For those of us who'd never been to Paris this in itself was exciting. To begin with a cocktail party at the Louvre, to be able to see the glamorous Opéra de Paris, and the trip to the famous chateau country of the Loire were the high lights for me.

The trip was arranged for us by our French confreres. They provided an enthusiastic guide and interpreter who did a splendid job (she was neither professionally).

The visit to Blois was particularly interesting. Our group was most fortunate in having Mlle. Ringuenet who was curator there (no mere guide) to escort us. We were shown rooms that were not open to the general public. Not only was Mlle. Ringuenet charming but she explained and gave the history so slowly and clearly in exquisite French that most of us understood all of it. Blois is one of the warmer chateaux with a fascinating history.

This indeed was a most satisfactory trip ending, after a good dinner and an abundance of wine, at Chambord where we saw "Son et Lumiére" at the Chateau there. This was extremely impressive, almost eerie. The surroundings and chateau were particularly beautiful. Even though it was a long day and long trip, most people were *pleasantly* fatigued.

FLORENCE K. WINTER

In Appreciation

The photograph of the Eiffel Tower appears in this issue through the courtesy of the French Government Tourist Office. The scenes of Paris which have been used in the *Physical Therapy Review* during the past year have been furnished by this organization, the French Travel Bureau, and the French Embassy Press and Information Service. Their cooperation is greatly appreciated.

Artist Designs *Review* Angels

The little angels on page 831 are the work of Mrs. Sheila Raymond, wife of physical therapist, Sidney Raymond. Many readers will remember the little angel that Mrs. Raymond created for the Association's 1955 Christmas card.

Index to Current Literature

(continued from page 786)

tion. John Marquis Converse, Rehabil. Lit., 20: 227-232, August 1959

More Effective Rehabilitation Through Rehabilitation Center and State Vocational Rehabilitation Agency Cooperation. Willis C. Gorthy and Nathan M. Slater, Rehabil. Lit., 20: 195-200, July 1959

The Rehabilitation Potential of Patients in Chronic Disease Institutions. F. W. Reynolds, M. Abramson and A. Young, J. Chronic Dis., 10: 152-159, August 1959

RESPIRATION

Sequence of Action of the Diaphragm and Intercostal Muscles During Respiration. II: Expiration. Alma Murphy, George H. Koepke, Edwin M. Smith and David G. Dickinson, Arch. Phys. M., 40: 337-342, August 1959

MISCELLANEOUS

Is Man Becoming Obsolete? David E. Price, Pub. Health Rep., 74: 693-699, August 1959

Coming Meetings

Dec. 1–4	American Medical Association, Clinical Meeting, Dallas
Dec. 26–31	American Association for the Advancement of Science, Chicago

Help Fight TB

Use Christmas Seals

Association News

Chapter News

District of Columbia

The October newsletter carried a detailed four page report of the June House of Delegates sessions wherein the Chief Delegate discussed action taken by the Delegates as well as briefly reporting National Office staff activities.

Florida

In October, the Chapter was co-sponser with the Florida Society for Crippled Children of a two day institute on the subject of hemiplegia. Announcement was made of the newly established Physical Therapist and Occupational Therapist Memorial Scholarship Fund. Recipients will be students in the physical therapy or occupational therapy curriculum of the College of Health Related Services, University of Florida. A "Scholarship Table" was located at the entrance to the meeting room during the institute.

Michigan — Eastern District

The September newsletter reports a newsletter exchange as follows: Eleven districts and chapters have sent copies of their papers in exchange for ours. They are most interesting and any one who would like to see them may do so at any meeting. The Newsletter Editor will have the folder on hand.

New Jersey

From the September issue of the newsletter: A sure way of keeping abreast is to make use of our professional organization. Too often we belittle the value of professional ties. All of us know how stimulating it can be to hear prominent speakers from the medical and paramedical professions or just exchange ideas and experiences with other P.T.'s. Meetings planned by our Chapter try to keep us aware of innovations in the field and of problems that need to be attacked if physical therapy is to continue to advance. Look over the dates set aside for our forthcoming meetings and try to keep those evenings free.

Why not bring a new member with you? Or start a car pool to the distant meetings. Come and help us make this year a successful one!!!

(Left to right) Mrs. Erwin D. Griswold, Miss Mary E. Switzer, Donald V. Wilson, and Miss Elson.

Mildred Elson Receives International Society's Award

Mildred Elson, Executive Director of the American Physical Therapy Association from 1944 to 1956, received the annual award of the United States Committee of the International Society for the Welfare of Cripples for "outstanding achievement in the field of international rehabilitation for the physically handicapped" during a luncheon meeting of the Society in Boston on Oct. 26, 1959.

Mary E. Switzer, Director of the United States Office of Vocational Rehabilitation, Department of Health, Education and Welfare, on presenting the award said that Miss Elson "has built much of the cornerstone of the medical aspects of modern rehabilitation and continues to play a leading role in the growth of rehabilitation services on an international scale."

Miss Elson served as Chairman of the International Committee to Form a Federation of Physical Therapy Societies, which created the World Confederation for Physical Therapy. She served as the first President of the World Confederation from 1951 to 1956. In her capacity with the American Physical Therapy Association, she was instrumental in organizing advisory services for physical therapists coming to the United States for postgraduate training, and for American physical therapists visiting other parts of the world. She has worked in organizing a number of international conferences, such as the

Third Inter-American Congress on Rehabilitation held in Guatemala, and the First and Second Institutes on Rehabilitation Problems held in Puerto Rico. As consultant to El Fundo, San Juan, Puerto Rico, Miss Elson played a major role in the establishment of the Puerto Rico School of Physical Therapy and Occupational Therapy, which has become a training source for personnel from Latin America.

Donald V. Wilson, Secretary General of the International Society, was the luncheon's principal speaker. His topic was "Rehabilitation and World Peace." Mr. Wilson pointed out that the Eighth World Congress of the International Society, the largest rehabilitation meeting of its kind ever to be held, will convene in New York City, Aug. 28-Sept. 2, 1960, and will bring together in the United States for the first time, an estimated 5,000 persons from all over the world. Mrs. Erwin N. Griswold, Belmont, Massachusetts, presided and gave an account of personal experiences in her talk, "Have Disability, Will Travel."

Association Member Commissioned

Col. Edward C. Sion, Chief Professional Services Division, FUSA Medical Section, swears in physical therapist Raymond F. Ben.

Raymond F. Ben, member of the Connecticut Chapter, APTA, was commissioned a second lieutenant in the Army Medical Specialist Corps September 17 at a ceremony on Governor's Island, New York.

Lieutenant Ben, a recipient of a bachelor of science degree from the University of Connecticut School of Physical Therapy in 1958, has been on the physical therapy staff of the Bronx, New York, Veterans Administration Hospital. He will be assigned to Fitzsimon Army Hospital, Denver, on completion of a four weeks' orientation course at the Army Medical Service School, Fort Sam Houston, Texas.

Marriages

Elaine J. Braverman, of Detroit, Mich., to Morley Cooper, Detroit.

Rita Costanza, of St. Petersburg, Fla., now Mrs. Rita C. Harter, Miami, Fla.

Susan S. Davis, of Bridgeport, Conn., to Norman G. Mosher, Jacksonville, Fla.

Jacqueline W. Feeley, of Chester, Va., to Thomas B. Pearman, Chester.

Barbara Gorman, of Boston, Mass., to Walter J. Aylward, San Francisco, Calif.

Dorothy Hertel, of Euclid, Ohio, to Thomas Bier, Dayton, Ohio.

Julia L. Kelley, of Akron, Ohio, now Mrs. Julia K. Samborsky, Gallipolis, Ohio.

Gabriella Krebs, of Philadelphia, Pa., now Mrs. Gabriella K. Isaacson, Philadelphia.

Carole McNeill, of Madison, Wis., to Douglas B. Bell, Madison.

Jean Morton, of Miami, Fla., to Roy M. Limberg, Miami.

Bette Plink, of Milford, Del., now Mrs. Bette P. Jordan, Flushing, N. Y.

Anne Scholz, of St. Louis, Mo., to Jack F. Allen, Kansas City, Mo.

Anne Smith, of Wilson, Va., now Mrs. Anne S. Wiltshire, Richmond, Va.

Viola A. Alver died on Aug. 10, 1959. Miss Alver received her education at Jamestown College, Jamestown, North Dakota, and the University of Chicago. She was granted a certificate in physical therapy through the Medical Department of the Army at Lawson General Hospital, Atlanta, Georgia, in 1944. A member of the Association since 1950, Miss Alver held membership in the Illinois Chapter from 1950 to 1958. At the time of her death, she was a member of the Florida Chapter, West Coast District.

Goldie Rossman Bryant, of Chehalis, Washington, died on Sept. 3, 1959. A member of the Association since her graduation in 1938 from Northwestern University, Mrs. Bryant held physical therapy positions in Cleveland, Ohio; Calgary, Alberta, Canada; Great Falls, Montana; and Seattle, Washington. Prior to her death, she had been a member of the Washington Chapter.

Helen Esther Trueblood, Santa Ana, California, passed away on Sept. 14, 1959, after a short illness. A graduate of Children's Hospital School of Physical Therapy, Los Angeles, in 1925, Miss Trueblood became a member of the Association in 1930. She had been employed for the past ten years in the Orange County, California, home care program. At the time of her death, Miss Trueblood was a member of the Southern California Chapter.

Miss Mary McMillan, a beloved and revered member of our Association, died on October 24 in Boston. She was our founding President in 1921 and through the years has supported the growth and development of the Association. As a physical therapist she has contributed to services for people on three continents. In recent years as an honorary and life member of the Association, she has continued a vital interest in the rising generation of physical therapists. All those who attended the Seattle Conference in 1958 will remember her words of wisdom at the banquet.

An early issue of the *Review* will be dedicated to Mary McMillan.

Dorothy F. Menefee, of Grand Rapids, Minnesota, died on Oct. 11, 1959. Miss Menefee received her bachelor's degree from the University of Minnesota in 1950 and completed physical therapy preparation at the Mayo Clinic in 1952. Miss Menefee became a member of the Association in 1952. For several years she was an instructor at the Frank E. Bunts Educational Institute in Cleveland. She will be missed but long remembered by her many friends, some of whom had the pleasure of enjoying the Annual Conference in Minneapolis with her.

Mary M. Spiller, of Philadelphia, died suddenly on October 19. She earned her bachelor's degree in 1957 at Swarthmore College and her certificate in physical therapy from the University of Pennsylvania in 1958. She became an active member of the American Physical Therapy Association in 1958. During the past year, Miss Spiller has been connected with the Arthritis and Rheumatism Foundation in Philadelphia and attended the Annual Conference in Minneapolis. Her death came as a shock to her friends and classmates.

Original Papers for Conference

Members of the Association who have been working on special projects related to physical therapy procedures—research, clinical or laboratory; reviewing results achieved with a group of patients; adaptation or application of new methods of treatment; or any other subject which will advance the profession—should plan now to report their work in Pittsburgh next June.

Two copies of manuscript, typed (double spaced), should be submitted to Dorothy E. Voss, Editor in Chief, *Physical Therapy Review,* by Apr. 1, 1960. The *Review* Editorial Board will select papers to be read by members and has the prerogative of publishing those papers selected. Members will be notified of the Board's decision not later than April 25.

Life Member Honored

Miss Tuft is congratulated by Edison Dick, President of Passavant Memorial Hospital, after the dedication of the Physical Therapy Department. To his right is John N. Hatfield, Director.

Miss Rubie M. Tuft, of Chicago, was honored when the Passavant Memorial Hospital on Sept. 30, 1959, dedicated the Rubie M. Tuft Physical Therapy Department.

In presenting Miss Tuft with a bronze plaque, Edison Dick, President of Passavant Hospital, said, "The warm and friendly atmosphere of our Physical Therapy Department reflects the personality of Miss Tuft, whose 24 years of devoted service is well remembered by thousands of Passavant patients and those who were associated with her."

Miss Tuft joined the Passavant Physical Therapy Department in 1931 and became director in 1944. She served in this capacity until she retired in 1955.

Miss Tuft received her physical therapy certificate at Northwestern University in 1929 and became a member of the American Physical Therapy Association through the Chicago Chapter the same year. After 27 years of active membership which she maintained until 1956, Miss Tufts was forced by illness to seek inactive status. She was granted life membership in the Association in 1958.

New Student Members

Albany Medical College

Donald W. Baehm
Judith L. Bogan
Dorothy A. Cook
Barbara A. Gaunt
Jean A. Palmer
Nancy Jo Smith
Anne L. Solman
Nancy A. Stengel
Carol M. Wesel

Bouve-Boston

Linda Bloch
Roberta Bradley
Judith A. Dagle
Carole M. Davis
Marcia A. Dill
Gayle L. Drummey
Judith M. Duane
Mikell Evans
Marcia D. Favor
Susan Fleming
Nancy L. Gardell
Mary L. Giberti
Sandra B. Glanzman
Lynne C. Gurney
Suzanne Hill
Patricia Hoag
Roberta M. Johnson
Judith S. Knox
Nancy A. Loffmin
Ann K. Messer
Amey V. Pepin
Elaine J. Pruitt
Mary C. Quenelle
Regina M. Regan
Lynn M. Roseman
Phyllis M. Sanders
Linda B. Sneider
Stephanie S. Stone
Drexey A. Wile

Columbia University

John W. Carr
Dorothy I. Dirks
Joan L. Ehrich
Marion B. Heim
Margaret A. Hofler
Hilda S. Huffman
Pasquale J. Izza
Marianna E. Karl
Phyllis A. Kraus
Linda J. Milber
Lee Ostvofsky
Barbara J. Read
Patricia A. Steenken
Cynthia B. Winslow
Phyllis R. Wright
Carolyn R. Zhe

Frank E. Bunts Institute

Julie A. Baker
Beverly J. Brooks
Wanda L. Brumfield
Laura M. Cheuvront
Dorothy L. Edgington
Joyce A. Guilford
Marilyn A. Gustavson
Miriam K. Hirsch
Robert C. Jaekle
Carole A. James
Mary A. M. Janos
Joan Keller
Nancy L. Martin
J. Neal Perrine
Ronald L. St. Pierre
Virginia A. Schmidt
Cynthia A. Walling
Sally L.Wren

Hermann Hospital

Dennis Aten
Robert L. Barnes
Constance Boze
Franck C. Calabrese
James Carlson
Joel Castro
Edwin B. Duncan
Darrol D. Dunham
Asa H. Ellis, Jr.
Dowell M. Fontenot
Glen Funkey
Claud F. Haws, Jr.
Johnny W. Hayman
Randal D. Houser
Laurie A. Lane
Robert L. Larson
Roger W. Long
Nelda Majors
Sally V. Mills
Morton W. Moriarty
Norman Mosallem
Sylvia K. Mutter
James J. Peters
Mary Ramey
Earl W. Runte
Richard G. Saddoris
William R. Schober
Richard S. Shefts
Thomas E. Slade
William H. Utt
Dale B. Womack

Marquette University

Joanne M. Cammack
Nancy L. Peik

Ohio State University

Judy A. Almoney
Irma L. Auber
Diane H. Berger
Lynn D. Burrell
David P. Connelly
Marsha L. Davis
Marcia A. Deming
Doris J. Dowell
Adele C. Eisenberg
Stanley L. Falor
Neva E. Farbizo
Janet C. Glick
Mary K. Goodwin
Nancy L. Greenwald
Gretchen K. Greiner
Donna J. Hessler
Nuralon I. Hiltbrand
Nancy R. McDowell
Joyce M. Rector
Barbara E. Schartz
Judith B. Smith
Patsy A. Soderstrom
Frances M. Sokos

University of Kansas

Robert L. Ashley
Donna L. Bowman
Joyce I. Carter
Alice J. Cohn
Sherrly A. Dees
Diana Dicks
Margaret E. Foote
Brian C. Ford
Julie Harnar
Judith Hirsch
Betty J. Jarrell
Jacqueline G. Jeffrey
Denise O. Kendall
Jo Ellen S. Lied
Carol J. Medley
Jacquelyn K. Miller
Judith J. Monhri
Annette W. Mueller
Rozanne Mulnix
Harriet Nigg
Mary E. Olson
Mary E. Phillips
Carol A. Pocock
James L. Sawatzky
Martha F. Smith
Norma J. Spresser
Bonnie L. Tomlinson
Sally Turner
Amalia J. Vazquez
Donald C. Waits
James L. Witt

University of Michigan

Barbara A. Christiansen
Diane C. Clark
Barbara E. Cole
Nancy L. Ellis
Doris A. Howe
Wesley M. Love
Nancy J. Melpolder
Kay Perring
Georgia E. Rylander
Virginia A. Scaramuzza
Marie A. Sciullo
Lois E. Thoms

University of Minnesota

Shelby J. Clayson
Thomas E. Hense
Georgene M. Howalt
Ida M. Newman

University of Oklahoma

Marolyn A. Barrett
Louana M. Horner
Hurley D. Hayes

University of Wisconsin

Gail L. Atkinson
Mary W. Bardwell
Robert A. Gabriel
Rita M. Getzel
Barbara L. Griffith
Susan J. Hardgrove
Katherine S. Menke
Sally B. Middleton
William D. Peterson
Marilyn W. Schmidtke
Judith A. Schnaitter
Diana K. Schunk
Robert J. Wiemer
Jane L. Zollar

It has been said that the magic of Christmas is participation. This must be true for we are happiest when we are giving and are filled with a warm glow when our gift is received with pleasure. Certainly, then, your year ahead will be filled with the joy and satisfaction that comes from giving to others what you alone can give—understanding, encouragement, and service.

PHYSICAL THERAPY REVIEW

With every good wish for the holidays

SHORT TERM COURSES FOR GRADUATE PHYSICAL THERAPISTS

Title of Course	*Sponsor of Course*	*For Details Contact*	*Dates of Course*
Cerebral Palsy	The North Carolina Cerebral Palsy Hospital Durham, North Carolina	Dr. Lenox D. Baker Medical Director No. Carolina C. P. Hosp. Durham, North Carolina	Courses arranged according to individual need—duration 3 months
Physical Therapy in the Care of Neuromuscular Disease	Georgia Warm Springs Foundation Warm Springs, Georgia	Robert L. Bennett, M.D. Medical Director Ga. Warm Springs Found. Warm Springs, Georgia	January April October
Technics of Neuromuscular Reeducation	California Rehabilitation Center Vallejo, California	Margaret Knott, Chief P. T. Calif. Rehab. Center Vallejo, Calif.	January 1 April 1 July 1 October 1
Functional Bracing of the Upper Extremities	U. of California and U. S. Office of Vocational Rehabilitation	Prosthetics Education Program Rm. B4-229, Medical Center University of California at Los Angeles 24, California	June 13—17, 1960
Upper Extremities Prosthetics	Postgraduate Medical School & College of Engineering New York University	Prosthetics Ed. Program New York University Postgrad. Medical School 550 First Avenue New York 16, N. Y.	May 31—June 10, 1960
	U. of California and U. S. Office of Vocational Rehabilitation	Prosthetics Education Program Rm. B4-229, Medical Center University of California at Los Angeles 24, California	May 9—13, 1960
Lower Extremity Prosthetics	Postgraduate Medical School & College of Engineering New York University	Prosthetics Ed. Program New York University Postgrad. Medical School 550 First Avenue New York 16, N. Y.	Feb. 15—26, 1960 Apr. 18—29, 1960
Above-Knee Prosthetics	Northwestern U. and U. S. Office of Vocational Rehabilitation	Director of Prosthetic Education Northwestern U. Med School 401 E. Ohio St. Chicago 11, Illinois	June 20—24, 1960
Below-Knee Prosthetics	U. of California and U. S. Office of Vocational Rehabilitation	Prosthetics Education Program Rm. B4-229, Medical Center University of California at Los Angeles 24, California	Jan. 18—22, 1960 Feb. 29—Mar. 4, 1960 April 4—8, 1960
	Postgraduate Medical School & College of Engineering New York University	Prosthetics Ed. Program New York University Postgrad. Medical School 550 First Avenue New York 16, N. Y.	Jan. 14—15, 1960 Mar. 17—18, 1960 Apr. 7—8, 1960
	Northwestern U. and U. S. Office of Vocational Rehabilitation	Director of Prosthetic Education Northwestern U. Med School 401 E. Ohio St. Chicago 11, Illinois	Feb. 8—19, 1960 March 7—18, 1960 May 9—20, 1960
The Physical and Occupational Therapist's Role in the Treatment of the Geriatric Patient	School of Allied Medical Professions U. of Pennsylvania	Roslyn Schlansky Coordinator of Special Courses School of Allied Medical Professions University of Pennsylvania 3901 Pine Street Philadelphia 4, Penna.	Feb. 22—26, 1960

Title of Course	Sponsor of Course	For Details Contact	Dates of Course
Neurophysiological Bases for Rehabilitation	School of Allied Medical Professions U. of Pennsylvania	Roslyn Schlansky Coordinator of Special Courses School of Allied Medical Professions University of Pennsylvania 3901 Pine Street Philadelphia 4, Penna.	Jan. 18—29, 1960
Treatment for the Cerebral Palsied	Children's Rehabilitation Institute for Cerebral Palsy Reisterstown, Maryland	Christopher H. Wiemer Executive Director Children's Rehab. Inst. Reisterstown, Maryland	Jan. 4—March 18, 1960 April 4—June 17, 1960 July 5—Sept. 16, 1960 Oct. 3—Dec. 16, 1960
Principles and Practice of Geriatric Rehabilitation	Dept. of Phys. Med. & Rehab. New York Med. College-Metropolitan Hospital Center	Dr. Jerome S. Tobis Professor & Chairman Dept. of Phys. Med. & Rehab. New York Medical College 1 East 105th Street New York 29, N. Y.	April 25—May 6, 1960

Education

Helen Hickey Klein Accepts New Position

Members of the American Physical Therapy Association serving on the State Selection Committees for The National Foundation's Health Scholarship Program will find themselves dealing with an old friend. Helen Hickey Klein, after five years' service in the Department of Professional Education, National Office, resigned September 15 to accept a position in the Department of Professional Education of The National Foundation.

As Consultant on the Health Scholarship Program, she will be involved in developing and administering the program, including the processing of applications, working with State Selection Committees, with local chapters of The National Foundation, with professional and educational associations, and others concerned with the development and implementation of the program. As time goes on, she will also participate in the ongoing program of the Division of Scholarships and Fellowships, particularly those concerned with upper division and graduate physical therapy students and graduate medical social work students. Mrs. Klein assumed her new responsibilities on Oct. 1, 1959.

Consultant in the Department of Professional Education

Anne Pascasio, of Philadelphia, joined the National Office Staff on October 15 as Consultant in the Department of Professional Education. She comes from the University of Pennsylvania, where she was Chief Physical Therapist in the Hospital of the University, and Instructor in the Graduate School of Medicine.

She holds master's and bachelor's degrees from the University of Pittsburgh, and is a graduate of the D. T. Watson School of Physiatrics, where she received a certificate in 1953. Prior to becoming a physical therapist, Miss Pascasio taught physical education for six years.

Miss Pascasio has been active in Association affairs throughout her professional life. She resigned as Chairman of the Program Committee of the Eastern District, Pennsylvania, when she accepted the assignment to the National staff. She was Treasurer of the Western District in 1955 and 1956, and Vice President of the Pennsylvania Physical Therapy Association, Inc., from 1957 to 1959.

Miss Pascasio replaces Helen Hickey Klein, who has accepted a position with The National Foundation.

Schools Offering Courses in Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

Schools offering the four year program leading to a baccalaureate degree accept high school graduates and transfer students. Schools offering the 12 to 16 months' program leading to a certificate accept students who have completed all or most of their undergraduate work providing they meet certain course requirements. Recipients of a degree and/or certificate have equal professional status. For specific information regarding each school's entrance requirements, curriculum, tuition and other fees, write to the physical therapy director indicated below. All students should investigate course requirements *early*.

	Degree	*Certificate*
CALIFORNIA		
Mary J. Dodge School of Physical Therapy Childrens Hospital Society 4614 Sunset Boulevard Los Angeles 27	‡	†
Ronald A. Hershey School of Physical Therapy College of Medical Evangelists Loma Linda	†	†
Lucille Daniels Division of Physical Therapy School of Medicine Stanford University Stanford (Palo Alto)	†	†
Margery L. Wagner Curriculum in Physical Therapy University of California The Medical Center San Francisco 22	†	†
Margaret S. Rood Department of Physical Therapy University of Southern California Los Angeles 7	†	†
COLORADO		
Dorothy Hoag Curriculum in Physical Therapy University of Colorado Medical School Denver 20	†	†
CONNECTICUT		
Frances M. Tappan School of Physical Therapy U 101 University of Connecticut Storrs	†	
ILLINOIS		
Elizabeth C. Wood Course in Physical Therapy Northwestern University Medical School 303 East Chicago Avenue Chicago 11	†	†
INDIANA		
Frances C. Ekstam Physical Therapy Program School of Medicine Indiana University Medical Center Indianapolis 7	†	
IOWA		
Olive C. Farr Physical Therapy State University of Iowa Hospitals Iowa City		†
KANSAS		
Ruth G. Monteith Section of Physical Therapy Education University of Kansas Medical Center Kansas City 12	†	†
MARYLAND		
Gladys E. Wadsworth, Ph.D. Department of Physical Therapy School of Medicine University of Maryland Baltimore 1	†	
MASSACHUSETTS		
Adelaide L. McGarrett Physical Therapy Department Boston University Sargent College University Road Boston 15	†	†
Constance K. Greene Department of Physical Therapy *Bouvé-Boston School, Tufts University Medford 55	†	
Shirley M. Cogland *Program in Physical Therapy Simmons College The Fenway Boston 15	†	†
MICHIGAN		
Virginia Wilson Curriculum in Physical Therapy The University of Michigan University Hospital Ann Arbor	†	†
MINNESOTA		
Dale V. Shaffer School of Physical Therapy Mayo Clinic Rochester		†
Wilbur L. Moen Course in Physical Therapy University of Minnesota 860 Mayo Memorial Building Minneapolis 14	†	

* Accepts women students only.

‡ Baccalaureate degree available from an affiliating college or university.

	Degree	Certificate
MISSOURI		
Sr. M. Imelda, S.S.M. Department of Physical Therapy St. Louis University 1325 South Grand Boulevard St. Louis 4	†	
Beatrice F. Schulz Department of Physical Therapy Washington University School of Medicine 660 So. Kingshighway St. Louis 10	†	
NEW YORK		
Dorothy L. McLaughlin Russell Sage College-Albany Medical College Division of Physical Therapy Albany 8	†	†
Mary E. Callahan Courses for Physical Therapists Columbia University College of Physicians & Surgeons 630 West 168th Street New York 32	†	†
Elizabeth C. Addoms Physical Therapy Curriculum School of Education, New York University Washington Square East New York 3	†	†
Mildred F. Heap Program in Physical Therapy University of Buffalo 3435 Main Street Buffalo 14	†	†
NORTH CAROLINA		
Helen Kaiser Division of Physical Therapy Box 3403, Duke University Medical Center Durham		†
Margaret L. Moore Section of Physical Therapy School of Medicine University of North Carolina Chapel Hill	†	
OHIO		
Robert D. Kruse, D.P.E. Course in Physical Therapy Frank E. Bunts Educational Institute 2020 East 93rd Street Cleveland 6	‡	†
Gladys G. Woods Curriculum of Physical Therapy Ohio State University University Hospital Columbus	†	†

	Degree	Certificate
OKLAHOMA		
Thelma Pedersen School of Physical Therapy University of Oklahoma, Medical Center Oklahoma City 4	†	†
PENNSYLVANIA		
Dorothy E. Baethke Division of Physical Therapy University of Pennsylvania 3901 Pine Street Philadelphia 4	†	†
Kathryn Kelley Division of Physical Therapy D. T. Watson School of Physiatrics Leetsdale	‡	†
PUERTO RICO		
(All classes given in Spanish) Lutgarda V. Piñeiro School of Physical & Occupational Therapy Candelaria & Mandry Streets Stop 22, Santurce	†	†
TEXAS		
Doris E. Porter Grady Vaughn School of Physical Therapy Baylor University Medical Center Dallas 10	†	†
Cecelia J. Lee School of Physical Therapy Hermann Hospital Houston 25	‡	†
Ruby Decker School of Physical Therapy The University of Texas Medical Branch Galveston	†	†
VIRGINIA		
Susanne Hirt School of Physical Therapy Medical College of Virginia Richmond 19	†	
WISCONSIN		
Beth J. Phillips Curriculum in Physical Therapy Marquette University School of Medicine 561 North 15th Street Milwaukee 3	†	
Margaret Kohli Course in Physical Therapy University of Wisconsin Madison 6	†	
U. S. ARMY MEDICAL SERVICE		
*Physical Therapy Course Army Medical Service School Brooke Army Medical Center Fort Sam Houston, Texas Write to: The Surgeon General Department of the Army Washington 25, D. C. Att.: Personnel Division		†

* Accepts women students only.

‡ Baccalaureate degree available from an affiliating college or university.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Abstracts

Preliminary Trial of a New Muscle Relaxant (Soma) In Outpatient Children with Cerebral Palsy.

Catherine E. Spears (Director of Child Neurology Clinic, Morristown Memorial Hospital, Morristown, N. J.) and Winthrop M. Phelps, ARCH. PEDIAT., 76:287-292, July 1959

The authors discuss their reasoning for publishing their preliminary findings in the use of this new drug—perhaps too hastily. They admit, this is against sound scientific principles but feel that presenting the results now of this uncontrolled study may encourage other investigators to study this new agent which they believe shows promising therapeutic value.

Soma is a skeletal muscle relaxant and was administered to 77 outpatients. There were 27 spastics, 11 rigidities, 34 athetoids, 2 ataxics, 1 child suffering from tremor, and 2 from unknown degenerative disease of the nervous system.

Regular examinations were made periodically by physicians which included blood counts and urinalysis. Physical therapists and others treating the patients also reported their observations during the time the drug was being given.

The only side effect noted was drowsiness in some of the younger children. No changes in blood count or urine attributable to the medication was observed. In 2 ataxic patients, the drug was discontinued because it caused them to be extremely sleepy and limp.

The remaining patients experienced an improved psychological state and there was a greater ease of attaining relaxation in treatment which permitted stretching and manipulation of heretofore rigid limbs. Often the patient was able to reassert voluntary control of the limbs. Decreased tension was noted in feeding, toilet activities and dressing. Walking was improved and children lost their apathy and took an interest in things about them.

In almost every case, bracing was facilitated by use of the drug. Sitting balance was improved in the rigidity patients due to the interruption of the extensor thrust. This has often taken up to 2 years to accomplish. The amount of drooling was reduced and because of better muscular control, verbal abilities were increased. The ability to tolerate braces for a longer period of time led to less deformities.

The authors state that administration of the drug Soma to cerebral palsy children hastened the results sought after in physical abilities and shortened the period of suffering through long term treatment for the patients and their families.

Resection for Pulmonary Tuberculosis

Neil C. Andrews (Division of Thoracic Surgery, Ohio State University Health Center, Columbus), AM. J. NURS., 59:962-966, July 1959

Resection as a method of surgical treatment for tuberculosis is recommended when medical therapy has failed to arrest the disease process and is limited to areas of active disease. The following conditions are indications for pulmonary resection:

1. *Cavity*—When tubercle bacilli are present in the sputum, bronchogenic dissemination of these organisms may result in spread of tuberculosis.

2. *Nodular tuberculosis*—Residual tuberculosis is an indication for resectional therapy when the sputum contains tubercle bacilli, or when social or economic factors prevent an adequate medical regimen.

3. *Destroyed lobe or lung*—Resection is indicated when multiple cavities and nodular areas are present and the intervening parenchyma is essentially nonfunctional.

4. *Symptomatic bronchiectasis*—Resection is indicated if mucosal ulcerations occur and result in either bleeding or sputum containing tubercle bacilli.

5. *Bronchostenosis*—When the lung distal to the narrowed bronchus is irreversibly damaged by either tuberculosis or nonspecific infection, resection is indicated. If the lung distal to the bronchostenosis is normal, bronchoplasty is performed.

6. *Thorocoplasty failures*—Patients whose cavities fail to close or whose sputum does not become negative following thorocoplasty must be considered for pulmonary resection.

This article discusses the preoperative and postoperative procedures which should be taken and why. Postoperatively, the drainage tubes are left in the pleural cavity to allow air, blood, and serous fluid to escape. Intravenous fluids and blood are given. An adequate airway is maintained and nasal oxygen is administered. The resectional procedures performed for tuberculosis are as follows:

1. *Pneumonectomy*—The removal of the entire lung is indicated when there is extensive pulmonary damage.

2. *Lobectomy or segmental resection*—This procedure is used to remove diseased portions of the lung.

3. *Subsegmental resection*—This technic allows removal of less than a full segment of pulmonary tissue.

4. *Wedge resection*—This may be used to remove small areas of disease lying close to the pleural surface.

The author discusses shock, hemorrhage, atelectasis, residual pleural space, bronchopleural fistula, empyema, postoperative pulmonary insufficiency, wound infections, and other postresection complications, giving possible causes for their occurrences.

The Professional Status of Nursing.

Genevieve K. Bixler and Roy W. Bixler (Nursing Education Project, Southern Regional Education Board, Atlanta, Georgia.), AM. J. NURS., 59: 1142-1147, August, 1959.

Fourteen years ago an article appeared in the *American Journal of Nursing* appraising the position nursing then occupied as a profession. This article by the same authors reexamines the status of nursing and focuses appraisal on the same seven criteria which were then used:

Criterion One: A profession utilizes in its practice a well defined and well organized body of specialized knowledge which is on the intellectual level of the higher learning.

Some progess is noted here. Nursing has faced squarely the need to identify the scientific principles peculiar to nursing. Basic science courses are being analyzed in the light of their contribution to the needs of the profession. Also the teaching in the better nursing schools focuses on the "why" instead of the "how" which indicates that an applied science of nursing is already being taught. There is also progress in the contribution of the behavioral sciences to nursing.

Criterion Two: A profession constantly enlarges the body of knowledge it uses and improves its technics of education and service by the use of the scientific method.

The research function of a profession constitutes this second criterion. Nursing has made much progress in the extension of its body of knowledge. Nursing organizations have supported research by encouragement, planning, and subsidy. The growing interest in research is shown by the unanimous action of the ANA House of Delegates in 1958 in adopting research as its number one long term objective. The establishment of the American Nurses Foundation by the ANA has stimulated several research projects which are being supported by the Foundation. The Foundation staff is also carrying on projects in three needed areas of research. These projects are being supported by the National Institute of Health and the Rockefeller Foundation.

Criterion Three: A profession entrusts the education of its practitioners to institutions of higher learning.

There is an increase in the number of schools offering preparation for nursing in the framework of higher education and also an increase in the number of students in such programs. There is a significant increase in the number of graduate programs in nursing.

Criterion Four: A profession applies its body of knowledge in practical services which are vital to human welfare.

It is pointed out that nursing is taking an ever increasing role in national and international planning and there is change from the self effacing attitudes of previous years to attitudes of confidence indicating professional equality with other and older professions.

Criterion Five: A profession acts autonomously in the formation of professional policy and in the control of professional activity thereby.

The work of the ANA in the development of function, standards, and qualifications has been an important step in the direction of professional autonomy.

Criterion Six: A profession attracts individuals of intellectual and personal qualities who exalt service above personal gains and who recognize their chosen occupation as a life work.

Nursing has acquired a more tolerant attitude toward the person who is both a nurse and homemaker. Many intelligent persons with families have gone back to school to acquire graduate degrees.

Criterion Seven: A profession strives to compensate its practitioners by providing freedom of action, opportunity for continuous professional growth, and economic security.

The nurse is enjoying an increasing prestige in national and international groups as well as local. The nurse is also being recognized more and more in retirement and employee security programs. Large numbers of scholarships and fellowships are provided for nursing education. There is also an increasing number of nurses qualifying for advanced education.

This article indicates that significant progress has been made since the previous evaluation. It warns, however, against complacency and against permitting a relaxation of ever higher standards for tomorrow's nurse.

Is the Cause of Pes Valgo-Planus ("flat feet") Unknown?

S. J. Wikler (1011 E. 4th Avenue, Hialeah, Florida) and T. Hale, Jr. (Albany Hospital, New Scotland Ave., Albany, N. Y.) MIL. MED., 124: 591-597, August 1959

This article gives various authorities' views on the cause and cure of "flat feet" and the complications that exist. Since 1900 the most noted theories on the cause of "flat feet" have been those of Whitman, Morton, Harris, and Beath. Yet all these conflict with each other and with facts brought forth. It was noted, however, that habitually barefooted people have no arch complaints at all.

Assuming that shoes do cause all arch trouble, we would find many disagreeing authorities. One authority may say that it is not the shoe but the fact that the habitually barefooted people often live in cultures with no processed or refined food. Another may say that arch trouble is due to weakness from sickness; others from chronic nervous exhaustion found in the shoe-wearing civilization.

Many doctors agree that shoes do cause our "arch trouble" but none agree on how shoes do it. Fairweather, an English surgeon, says the heels of our shoes throw the feet off balance causing arch trouble. Wikler contends the toe part of shoes is the principal cause. The patent office has granted many patents on shoe features designed to prevent fallen arches.

Foot trouble increased significantly around 1900 with the new shoe manufacture that made possible the stylish inexpensive shoe. Every foot specialist sees the damage of the woman's pointed-toe shoe.

In answer to the question of the pathomechanics of "fallen arches," many views are completely opposite. Wiles states that flat feet are nearly always due to faulty posture. Hale disagrees and says that faulty posture is usually secondary to weak arches.

Concerning the success of treatment, Dr. Wikler states that in his 20 years of clinical experience he has never met a foot specialist who would offer an absolute cure once arch trouble becomes chronic. Dr. Wikler also feels that the children with the worst feet are those who might have had good feet had their parents not become overconcerned about their toddlers' normal, insecure, flat feet. The inflexible shoes and so-called "helpful devices" distort the normal activity. Others' ideas pro and con are given in this article.

Although no textbooks state that the cause is unknown, we must assume that most of the causes given are not entirely correct since most of them differ. In judging the accuracy of our foot surveys, we come to the question of whether different examiners are looking for different things in flat feet. A comprehensive survey with precise controls is clearly indicated. In summary, every authority on arch trouble has a definite and different opinion on what "fallen arches" is, what causes it, and how to treat it.

Infectious Neuronitis (Guillain-Barré Syndrome) in Children.

Albert F. Peterman, David D. Daly, Francis R. Dion and Haddow M. Keith. (Department of Neurology and Pediatrics, Mayo Clinic, Rochester, Minn.), NEUROLOGY, 9:533-539, August 1959.

The authors made a study of this illness in children 15 years of age or less. Twenty-six cases were felt to meet the criteria for the diagnosis of this disease. Antecedent infections often precede the development of neuronitis although due to the long interval between infection and onset of the neuronitis this may be coincidental. Bilateral symmetrical muscular weakness primarily of the lower extremities is characteristic; however, in half of the patients weakness developed in muscles supplied by cranial nerves. Areflexia was present in all patients at some time during the illness.

Cerebrospinal fluid studies in 25 cases revealed albuminocytologic dissociation, the protein attaining its highest level 10 to 25 days after appearance of clinical symptoms. Electromyographic examinations on 10 cases revealed features compatible with involvement of lower motor neurons of peripheral nerves. Reduction of conduction time was noted in peripheral nerves particularly after initial onset of the disease.

Most children recover though the illness may last two or three years and relapses may occur.

Results of Cerebral Surgery for Motor Disorders

John A. V. Bates (Neurological Research Unit, Medical Research Council, National Hospital, Queen Square, London), CEREBRAL PALSY BULL., Lond., 6:29-32, Summer 1959

Neurosurgical procedures of the past 4 or 5 years claim to relieve symptoms of tremor and rigidity without adding motor deficits.

Irving Cooper of New York initially destroyed brain tissue by occluding the anterior choroidal artery which supplies a variable amount of the basal ganglia, internal capsule, and thalamus. Variable results led to his use of alcohol injection, while others used electrocoagulation or a leukotome. Although X-ray shadows of the ventricles serve for all as landmarks in these procedures, no one is confident of accurate localization.

The author's experience, admittedly less than Cooper's, convinces him of the validity of claims that some long standing tremor and rigidity can be relieved immediately, and so far permanently, without loss of fine finger movements. The same procedure has been tried for various spastic conditions, but without success. Successes have been claimed in some cases of dystonia musculorum deformans in childhood, and hemiballismus. With these results in mind, the following facts deserve consideration.

1. The operation affects only tremor and rigidity on the contralateral side.

2. Tremor and rigidity are affected immediately—within 5-10 seconds in favorable cases.

3. Effects of electrical stimulation at the site before making the lesion offer an interesting field for further investigation.

4. To date, sufficient postmortem material is unavailable. Therefore, uncertainty concerning the lesion of choice persists.

These four facts emphasize a need for more honesty about basic ignorance of the mechanism through which the efferent side of the nervous system operates.

The author proposes six suggestions in an attempt to explain the result of this crude and blind procedure. Three of these suggestions are summarized as follows.

It may offer surgical assistance to nature by eliminating malfunctioning nerve cells which disturb the function of distant normal, healthy nervous tissue.

The absence of motor deficit after this operation may be explained if the resulting relief of rigidity is merely a concomitant superadded hypotonia of cerebral origin overriding the rigidity.

This last implication is more than "most people will swallow," namely, that the same nervous structure would have different functions in different individuals.

There are many possible explanations for the results of destruction of nervous tissue deep in the cerebral hemisphere, but the full significance of the results awaits postmortem studies of the lesion in successful and unsuccessful cases.

Scoliosis and Herniation after Osteoplastic Thoracoplasty

Viking Olov Björk and Roland Bunner (Sabbatsberg Hospital, Stockholm, Sweden), J. THORAC. & CARDIOVAS. SURG., 38:81-89, July 1959

Osteoplastic thoracoplasty used following a pulmonary resection is a procedure to decrease the thoracic cavity size. It has the following advantages over other such type procedures: a permanently decreased cavity tailored to accommodate the remaining lung, a one step procedure which is cosmetically good, a stable chest wall without paradoxical movements, and an excellent functional result, both as regards pulmonary function and arm movements.

In this procedure the second rib is cut as short as possible and placed close to the mediastinum. The posterior end of the second rib is fixed to the costovertebral ligament. The superior intercostal muscle bundle on top of the second rib is sutured to the mediastinum to form the roof of the reconstructed cavity.

In a follow-up study of 104 patients it was found that there was a negligible incidence of herniation through the roof, minimal scoliosis, some deviation of the trachea to the side of surgery, and no severe impairment of the diaphragmatic movements.

A Study of the Causes and Prevention of Edema of the Arm Following Radical Mastectomy

John P. West and John B. Ellison (Surgical Service, St. Luke's Hospital, New York, N. Y.), SURG. GYN. OBST., 109: 359-363, September 1959

Edema of the arm is a common, and occasionally distressing, complication of radical mastectomy. In a few patients the enlargement of the arm is disfiguring and of such size as to interfere with function of the extremity.

Classification of the amount of edema is difficult. However, reports on patients studied by various authors showed that approximately 50 per cent of such patients had some edema of the arm. In about 10 per cent the swelling was of a marked degree.

The pathologic changes responsible for the edema are not completely clear. It has been postulated that the causative factors may be any of the following: obstruction of the lymph channels secondary to the axillary dissection; venous obstruction; delayed healing or increased fibrosis; infection.

The authors report on a study of 104 patients who were available for a follow-up examination following radial mastectomy. The patients were divided into 4 groups depending on the degree of edema as indicated by comparing the circumference of the arms. In order to evaluate various factors, which might contribute to the development of edema, the cases were divided into the following three groups; (1) edema in relation to wound healing; (2) edema in relation to the type of incision; (3) venous obstruction as a cause of edema.

As a result of this study the authors concluded that delayed wound healing caused by skin necrosis, infection, or the prolonged collection of fluid in the axilla appeared to be the most important cause of edema in the patients reviewed. Radiation therapy was thought to be a minor causative factor in some cases.

The type of incision used did not appear to have a significant influence on the development of edema of a

moderate or severe degree. Only 1 of 10 patients studied by venography showed evidence of venous obstruction. Lymphatic obstruction was thought to be the pathologic basis for the edema in most instances.

Blood Viscosity in Cerebrovascular Disease—Effects of Low Fat Diet and Heparin

Roy L. Swank (University of Oregon Medical School, Portland), NEUROLOGY, 9:553-560, August 1959

Recent investigation on the effects of high fat consumption has shown that there are changes in adhesiveness and aggregation of red cells, increase in the blood viscosity, and slowing of circulation. This has demonstrated that perhaps mechanisms related to the blood itself may be important in the relationship of ischemia in vascular disease to the amount of fat consumed. This paper presents evidence that there are changes in the blood viscosity and buffy coat of patients with cerebrovascular disease and that reducing the fat intake of these patients does effect changes in their blood viscosity.

A low fat diet containing 15 gms. of hard fat and 20 gms. of vegetable or fish oil was followed by all participants in this study. Blood viscosity measurements in duplicate were determined on whole blood without anticoagulants. Thirty-seven control subjects were used. Blood viscosities and hematocrits were done weekly with an average of 8 studies done per subject. The same determinations were done on 36 patients with clinically proved cerebrovascular disease, with an average of 26 studies per patient.

Of the 37 controls 62 per cent had a low blood viscosity index. Of the 36 patients with cerebrovascular disease 94 per cent had a high index. In the control subjects with low blood viscosity no change occurred in the viscosity when the diet was followed for up to 14 months. Those controls with high blood viscosities showed significant lowering of the index after 6 months on the diet.

Thirty cerebrovascular patients were placed on the low fat diet and their progress noted from 6 to 30 months. The blood viscosity changed little in the first 3 to 6 months on the diet. After this the viscosity relative to the hematocrit decreased.

In 10 patients heparin was also administered during the first 2 to 6 months on low fat diet. The heparin influenced the blood viscosity little or not at all since the viscosity remained high during the time heparin was used.

In addition to the blood viscosity, observations were made of the gross structure of the buffy coat in the hematocrit tube. It has been shown that this coat is often pink or red in color due to admixture of red cells when high fat diets are eaten. This is thought to be due to the increased adhesiveness of the red cells. In this clinical study it was found that 93 per cent of the cerebrovascular cases had mixing of 3+ (3+ being more than ¾ of the buffy coat infiltrated with red cells). The low fat diet did not have any significant effect upon this phenomenon.

Plasma viscosity was not studied extensively but the few studies done showed that cerebrovascular patients had higher plasma viscosity and this did decrease on low fat diet. It was also noted in cerebrovascular patients that blood viscosity and viscosity index were higher during periods of inforced bed rest and dropped during moderate activity.

Because of the normal vascular system's high factor of safety the increase in blood viscosity described here would have no noticeable effect on the circulation to cause ischemia. However with the development of atherosclerosis and narrowing of the vascular lumina the safety factor is reduced and eventually the point is reached at which the circulation is critical. At this point, a high blood viscosity might cause a significant decrease in blood flow and result in ischemia and infarction.

The Unsuccessful Aged

Jeannette L. Baker (Fergus Falls State Hospital, Fergus Falls, Minnesota), J. AM. GERIAT. SOC., 7:570-572, July 1959

The purpose of this paper is to stimulate interest in the causes of senile behavior. The author states that many of the unfortunate manifestations of aging might be treated more effectively or even prevented if we were to regard them as a result of inability to adjust to stress rather than due to arteriosclerosis.

Senile behavior is likened to spoiled-child behavior in that both stem from the same factors and lead to similar reactions. The reactions of the child and the unsuccessful aged to rejection result in attention-getting behavior such as irritability, stubbornness, whining, stealing, hoarding, wetting, soiling, and temper tantrums. Unfortunately these devices are annoying and generally bring more rejection.

In a comparison between the successful and unsuccesful aged it was found that the dependent person, who fails to form satisfying relationships with others and whose interests are exceedingly narrow, tends to respond to potential trigger mechanisms causing emotional breakdowns. It was found that regardless of whether their diseases were organic or functional, a significant number of people over age 60 could be helped in a measurable degree by giving particular attention to supplying their psychological needs. They need to love, to be loved, to have self respect, self confidence, security, and a sense of belonging; they need to feel important to others, and they need normal social contacts with all age groups.

How to prevent the breakdown of the patient's defenses is probably one of the most important problems confronting the medical profession today. For the present, the best hope of prevention is the exercise of tolerance, understanding and patience in helping our elders to strike a balance with life after suffering a traumatic episode. For the future, the best prevention lies in the education of young parents for the job of building more adequate defenses against the stresses and strains of life.

Paralytic Poliomyelitis Trends, Canada, 1958

D. Kubryk (Department of National Health and Welfare, Ottawa, Canada), CANAD. M. ASS. J., 81:228-231, Aug. 15, 1959

The year of 1958 provided evidence of a persisting risk of epidemic poliomyelitis in Canada. For the first time since the advent of the Salk vaccine, reported cases of paralytic poliomyelitis increased sharply under the impact of an epidemic in Manitoba and a lesser outbreak in Quebec. The number of paralytic cases in 1958 was 43 per cent higher than in 1957. The primary targets were the unvaccinated, especially preschool children and adults. In Manitoba 78 per cent and in Quebec 92 per cent of cases occurred among the unvaccinated.

If the repetition of last summer's outbreak, during which cases of paralytic poliomyelitis increased for

the first time in six years, is to be avoided, it is imperative that the drive for vaccination receive the fullest kind of backing. Now that the school age group is fairly well protected, the same protection should be extended to the preschool age groups where most of the cases occur, and to adults, in which groups most of the deaths occur. Among the adults, the 25-34 age groups should receive special attention. These are the young parents who may be infected by their vaccinated children, acting as symptomless carriers.

Abstracters for December

We are indebted to the following Association members for assistance in the preparation of the abstracts that appear in this issue of the *Review:*

Rachel Adams	Billie Gray
Molly Brown	Estil Latimer
Ethel Coeling	Carol Natrop
Jean Cuthbertson	Helen Weber
Miriam Partridge	

Book Reviews . . . . .

Poliomyelitis Papers and Discussions presented at the Fourth International Poliomyelitis Conference. *Edited by Morris Fishbein, M.D., Chairman, Committee on Publications; Vice President, International Poliomyelitis Congress. Cloth; price $7.50. Pp. 684; illus. J. P. Lippincott, Philadelphia, 1958.*

Disease titled, but not disease centered, the reports of the Fourth International Poliomyelitis Conference are a tribute to the great advances made in man's health knowledge by concentration and coordination of attack on a low incidence disease. Well over 100 papers are presented by world authorities on work ranging from cellular metabolism to vocational rehabilitation. These proceedings, in contrast to the three previous ones, clearly separate into virology and clinical sections, each with subgroupings. The generous utilization of discussants is of particular value in aiding the reader in obtaining a better emphasis and perspective on the formally organized material. There is a strong sense of accomplishment and direction not found in previous conference records.

The section on virology is appropriately keynoted by Dr. Jonas Salk, presenting "Basic Principles Underlying Immunization with a Noninfectious Vaccine." Dr. Salk points out the facts of great host and vaccine variability and the importance of further knowledge of the mechanisms of immunity, in order that the problems of adjusting vaccine potency, spacing, and number of injections can be more optimally determined. Strong points on the merits of both the inactivated and the attenuated vaccine follow. The killed vaccine is questioned as to the maintenance of adequate antibody levels and as to its practicality in world wide immunization. The attenuated virus, while conferring a more natural and practical immunity, is questioned as to its possible lack of stability which may lead to altered virulence. Dr. C. H. Andrewes points out that both types are complementary and potentially effective weapons against poliomyelitis, and their place may well be determined by the epidemic, social, and economic status of a country.

Epidemiological studies on enteric viruses producing diseases simulating poliomyelitis, tissue culture, and general considerations of viruses emphasize that the poliomyelitis virus represents only a small portion of a large variety of enteric viruses. The sharp dividing line between the poliomyelitis, coxsackie, and ECHO viruses is disappearing. Studies of these latter viruses may well lead to information as to changes in virulence and production of serious disease. Technical advances in tissue culture, electron microscopy, and electrophoresis have allowed investigation to go past the organ and tissue to the study of the genetic and physiological behavior of virus particles and the cell.

Laboratory methods as an aid to differential diagnosis and the diagnosis of immunity are presented. The best aid in diagnosis during the acute stage is isolation of the virus from the feces. Reports are made of confirmation of diagnosis in from 75 per cent to 100 per cent of paralytic cases. The accuracy of the procedure seems to depend more on early and proper collection of human fecal material than on the technic of the method used to isolate virus. The complement-fixation and neutralization tests require serial blood samples that show a rise in poliomyelitis antibodies following an infection or immunization. A search is being made for a simple, reliable, and rapid laboratory method for differential identification of viral infections.

The clinical portion of the book is devoted to "Care of Patients Severely Stricken by Poliomyelitis." The majority of the authors present treatment advances and findings of the 15 Poliomyelitis Respiratory and Rehabilitation Centers in the United States. In addition, the evolution, effects, and an example of the overall program of these centers are well summarized in the subsection on "Group and Home Care of Patients. . . ."

Statistically the outcome of severe poliomyelitis treated under favorable conditions appears to be fairly well established worldwide in spite of the difficulties in comparing figures. "Statistical Considerations in Mortality and Prognosis" are given in three papers and are found in part in several other papers. The mortality rate of paralytic poliomyelitis is 5 per cent or less, with Los Angeles reporting a 1.4 per cent rate in 1954-55. Approximately 85 per cent of the respiratory patients gain sufficient spontaneous breathing so that they are ultimately able to do without breathing aid.

In his introduction of the medical care section, Dr. James L. Wilson states that in previous conferences the technics of saving life have dominated; he hopes that at this conference attention will also be given to making this life useful. Throughout, this moral responsibility has been accepted. This is found not only in papers on philosophy of care, psychological and vocational considerations but in the papers on medical technics. Thus Dr. Fred Plum in presenting "Emancipation from the Respirator. . . ." stresses strongly that total emancipation is subordinate to total rehabilitation. Other repeated consistencies emphasized by many authors are the importance of:

1. Evaluation in order to provide anticipatory and preventive treatment,
2. Early coordinated multidisciplinary care,
3. Careful timing and constant individualization of use of treatment procedures.

The entire medical section is concerned with applied physiology in the treatment of the interrelated respiratory, circulatory, biochemical, genitourinary, gastrointestinal, and musculoskeletal disturbances which occur as a result of severe disease or secondarily to its treatment. For

example, both Dr. James L. Whittenberger in his presentation of "Respiratory Mechanics..." and Dr. William A. Spencer in his paper on "Circulatory Disturbances...," point out the difficult problems and the judgment required in adequate balancing of respiratory, circulatory, and metabolic functions with the use of mechanical breathing devices.

The papers and discussions on paralytic scoliosis give an excellent view of the type of work and current thinking on the problem. Dr. Robert Bennett presents a classification of four types along with their evolution and treatment. Dr. Carlos Ottolenghi presents an outline of surgical procedures and considerations. Dr. Paul R. Harrington's method of internal fixation by mechanical means is one of the particularly interesting discussions. There seems to be general agreement by these authorities that:

1. The etiology of progressive lateral and rotatory scoliosis is paresis or paralysis of spinal musculature. Other factors may be contributory, but they are secondary.
2. Growth causes a more severe progression of the deformity.
3. Treatment is directed toward minimizing and delaying serious changes, because prevention or correction of the causes or the deformity are not always possible.

Few physical therapy technics per se are included, but a great deal of information will be found which will enhance intelligent and better application of technics.

Dr. Frank Cooksey and Dr. J. W. Sharrard in a section on neuromuscular rehabilitation agree that intensive exercise may, and should, begin one month from onset. Dr. Fritz Buchthal compares muscle strength and electromyographic findings in a study of the prognostic implications of the action potential.

"Glossopharyngeal Breathing..." is presented by Dr. Clarence W. Dail and referred to in several other papers as being a most valuable aid for increasing lung compliance as well as allowing freedom from mechanical breathing devices.

"Swallowing Mechanism and Its Disturbances" contains cinefluorographs, diagrams, an extensive bibliography, and a discussion centered on normal swallowing.

While this volume touches on many phases and aspects of medicine it does not, of course, explore any one fully. It does present a good outline of principles on many topics and is filled with valuable statistics, pictures, graphs, and bibliographies. Concise and organized for easy reading, the book will serve as a reference for the entire health profession. It will also be valuable for those who desire a recent survey of the problems encountered, the treatment technics used, and the programs developed for a severely devastating disease such as poliomyelitis.

Suspension Therapy in Rehabilitation. *By Margaret Hollis, M.C.S.P., Principal, School of Physiotherapy, Bradford Royal Infirmary; and Margaret H. S. Roper, M.C.S.P., Lecturer in Physiotherapy, University of Cape Town. With a foreword by Sir Arthur Porritt, K.C.M.G., K.C.V.O., C.B.E., M.A., M.Ch., F.R.C.S., Sergeant Surgeon to H.M. the Queen, Surgeon to St. Mary's Hospital, Paddington and the Royal Masonic Hospital, London. Cloth; price $6.00. Pp. 220; illus. Williams & Wilkins, Baltimore, Md., 1958.*

Suspension Therapy in Rehabilitation is a book which was written to serve as a practical textbook on suspension therapy. It continues and brings up-to-date the original work of Mrs. Olive Frances Guthrie-Smith which was started during World War 1. The authors present in detail the essential principles governing the use of suspension, springs, and pulleys and explain the basic technics required to carry out these principles. By giving examples to clarify them, the reader is encouraged to use initiative and adapt the basic technics to fit the needs of each individual patient. Frequent warnings are given regarding positioning, stabilizing, and substituting. The reader is also reminded that, like any other apparatus, this agent will be effective only when the therapist directs its use with an understanding of the patient and his disability, the specific goal of the treatment, and the potentialities and limitations of suspension apparatus.

The book has been prepared in two parts. The first twelve chapters present the mechanical principles and technics of suspension, spring and pulley therapy, and the history of the development of these technics. The latter history is essentially the product of the notes of Mrs. Guthrie-Smith who died while the book was being planned. Part 11, Chapters 13 through 18, describes suspension, spring and pulley therapy as applied clinically to the following specific conditions: rheumatic diseases, spinal paraplegia, amputations, geriatric patients, and some diseases of the nervous system. These chapters were written by different contributors who are specialists in their respective fields.

The style of writing is clear and concise. The specific principles, procedures, and treatment objectives are presented in detail and frequently outlined briefly for futher emphasis.

Suspension Therapy in Rehabilitation should be a helpful reference book for all those who believe in the importance of self activity in the rehabilitation program of the disabled. It should also be helpful to the student who wishes to learn and the therapist who wishes to review the actual equipment itself as well as the mechanical and physiological principles underlying the use of suspension, springs and pulleys.

Kinesiology. *By Ellen Neall Duvall, Ph.D., Director, Department of Health, Physical Education and Recreation, Spelman College, Atlanta, Georgia; Holder of a John Simon Guggenheim Memorial Foundation Award, 1953-54. Cloth; price $5.75. Pp. 292; illus. Prentice-Hall, Inc., 1959. Englewood Cliffs, N. J.*

This book is intended to be used by students of physical education, physical therapy, and occupational therapy who have a foundation in structural anatomy and are beginning the study of kinesiology. It was constructed to contain basic principles for the student and to serve as a guide for the instructor.

Included in the book are both accepted and controversial material concerning muscle actions. Where there are differences of opinions among authors of anatomical texts and authors such as the Kendalls, Wright, Steindler and Duchenne, the author briefly expresses the varying viewpoints, and in many instances, summarizes these opinions. The student familiar with kinesiological studies should find these sections interesting since material from several sources is drawn together. However, the beginning student might find it difficult to realize why such disagreements exist. The methods by which a student might make his own analysis of specific muscle function seem vague.

The type used in this 292 page book is large enough to provide reading ease. Several exceptionally clear black and white anatomical drawings by Helen Lorraine are included for the reader's visualization

of essential areas. The style of writing is clear and direct, and the new anatomical terminology is used.

The book is divided into three parts: I The Motion Mechanism, II Function of Individual Muscles, and III Analysis of Motion. Each part is subdivided into chapters making a total of nine chapters.

Logically placed are several up-to-date easy to use bibliographies. An organized and usable index concludes the book.

Muscles described in Part II, Function of Individual Muscles, are divided according to their actions on specific joints. When a multijoint muscle is described, the origin, insertion, innervation, and actions are given for one joint, and for the remaining joints the muscle is listed again, giving only its function. Page numbers for the description of location and nerve supply are given, requiring the reader to leaf a few pages to review the muscle as a whole. This means that for a multijoint muscle, the function of that muscle is separated with the description of the muscle given only once.

The description of muscle location is stated clearly and contains the essential information. Some functions of muscles important to a physical therapist have not been included, and the definition of circumduction and the description of opposition seem confusing. The basic mechanical principles are dealt with briefly with very few anatomical examples. The intrinsic muscles of the foot are briefly described, but the facial muscles have been omitted.

The last chapter contains a discussion of problems of analysis of motion, suggesting an approach to analysis and giving some examples, one of which is stair climbing.

Physical therapists interested in basic muscle function will enjoy reading this book. It should also be of interest as a reference book to students in kinesiology courses.

Clinical Orthopaedics Vol. 11: Orthopaedic Surgery in the Geriatric Patient. *By Anthony DePalma, Editor in Chief, and contributing authors. Cloth; price $7.50. Pp. 257; illus. J. B. Lippincott, Philadelphia, 1958.*

This book is one of a series devoted to general and specific orthopedic problems. This particular volume is concerned with orthopedic surgery in the geriatric patient, and general orthopedic subjects with some emphasis on a few specific items. For the physical therapist, the book is one of general interest and reference. The therapist's understanding of the aged patient will be improved by reviewing the specific orthopedic problems that are discussed in this issue. The articles in this book are strongly shaded by authors' personal opinions, specifically that article covering cerebral palsy. It is good, however, for the therapist to be aware of divergent opinions.

The paper, illustrations, printing, bibliographies, and plates are good, although the references are limited.

The physical therapist will be interested in reviewing the table of contents, looking at the illustrations, and reading particular articles in more detail when the occasion arises. This book also gives the reader a chance to review medical Spanish, as there is a summary of each article in Spanish.

Anatomy and Physiology. *By Joyce W. Rowe, S.R.N., S.C.M., O.N.C., Sister Tutor Diploma (London); Sister Tutor, Mansfield Orthopaedic Hospital, Northampton; Member of the Panel of Examiners for the Joint Examination Board; and the General Nursing Council of England and Wales. And Victor H. Wheble, M.A., B.M., B.Ch. (Oxon), F.R.C.S. Ed., Dip. Med. Col. (Antwerp); Senior Orthopaedic Registrar Mansfield Hospital, Northampton; former Lecturer in Anatomy and Physiology, School of Occupational Therapy, St. Andrew's Hospital, Northampton. Cloth; price $8.00. Pp. 684; illus., E & S Livingstone, London and Edinburgh, 1959.*

This textbook on anatomy and physiology has been written primarily for nurses with special consideration for the orthopedic nurse. It is designed to give the information required by the Examining Board for the Orthopedic Nursing Certificate of the Joint Examination Board of the British Orthopedic Association and the Central Council for the Care of Cripples. Questions from previous preliminary and final orthopedic examinations are listed for review at the end of each chapter. The authors hope that this text might be of value to other students who are training in ancillary medical services.

The aim of the authors is to present facts of anatomy and physiology in a concise fashion with a minimal use of technical terms and to give a balanced knowledge of structure and function. Illustrations for clarity are used throughout both areas. The general format is excellent in that it gives a practical approach by considering each system from four standpoints, namely: anatomy, applied anatomy, physiology, and applied physiology. The material is presented clearly and is well organized; however, in some areas there is a tendency toward oversimplification which leaves the reader with a general impression rather than a thorough understanding of the subject. The applied anatomy and physiology of the nervous system is too limited to be of value to occupational and physical therapists.

The anatomy and physiology of the entire body is considered by dividing the text into three parts. Part One, General Principles of Anatomy and Physiology, includes a chapter on the body as a whole and one in which the tissues of the body are described briefly. Part Two, Systematic Anatomy and Physiology, describes each system of the body including the bones, joints, and skeletal muscle as well as the internal systems. More consideration seems to be given to the structure than to the function of some of the systems. Part Three, Regional Anatomy and Physiology, consists of a chapter in which each region is described by starting at the surface and working inward. Surface anatomy is not illustrated. A great number of deep structures are shown on one figure. An X ray of each joint is presented. A short discussion of general body mechanics and body mechanics in relation to nursing tasks is given in the last chapter.

The presentation of structure, function, and the application of each to the nursing field may make this an additional reference book for therapists, but it will not replace the more comprehensive textbooks of anatomy and physiology.

Anatomy and Physiology for Nurses. *By W. Gordon Sears, M.D., (Lond.), M.R.C.P., (Lond.), Physician Superintendent, Mile End Hospital, London, Examiner to the General Nursing Council for England and Wales. Ed. 3. Cloth; price $3.50. Pp. 376; illus. Williams & Wilkins Co., Baltimore, exclusive U. S. Agents, and Edward Arnold Ltd., London, 1958.*

This is a textbook for student nurses. The author's purpose was to provide an elementary text combined

with a scientific and technical approach and to present all the facts necessary for examination purposes, particularly for the syllabus laid down by the General Nursing Council for England and Wales.

An introductory chapter gives an overview of basic structure and function, followed by material on the different systems of the body, a section on metabolism, diet and nutrition, one on the skin and the regulation of body temperature, and a brief section on voice production and speech. There is an appendix which includes a discussion of the scalp, some aspects of surface anatomy, and anatomical and physiological changes during pregnancy. There are questions at the end of each chapter and a group of questions at the end of the book for use as a supplementary guide.

The format of the book is simple. The type is clear, the illustrations are mainly drawings with a few X-ray plates. It would have been helpful to have with each chapter a topical outline at the beginning and a summary at the end, plus a list of references and a glossary. The nervous system is placed in the latter part of the book. Since a clear understanding of the nervous system is so essential to comprehend the other systems of the body, to consider the body as an integrated functioning whole, and to develop an appreciation of the major role of the nervous system in the acts of daily living, it would have been advantageous to have it placed early in the book.

The author presents the material in a simplified way. The anatomy and physiology are discussed concisely and clearly. Practical examples are given; however, the examples, at times appear to be superfluous, beside the point, or give only a sampling of the total picture. Some of the examples given could better have been left to be covered in other courses. For example, (in the section on metabolism, diet and nutrition) in discussing milk, on page 234, the author states that, "milk may be a source of danger to health," continuing with a brief discussion of the reasons why. No mention is made of any protective measures and the student could well be left with the central thought that milk is dangerous. It is doubtful whether the student at this stage of her training would have sufficient knowledge and background to make her own application and fill in the gaps. One feels that there is a real danger of misinterpretation and misapplication of many of the examples given. Where additional practical material would have been helpful is in the area of bones, muscles, joints and nerves, from the point of view of function and prevention of deformity. This area is a continuing thread in all nursing.

This book can be useful for student nurses as a supplement to other textbooks if it is kept in mind that guidance and interpretation are needed in regard to the material presented.

The reviews published here do not necessarily represent the opinions of the American Physical Therapy Association.

Book Reviewers for December

Jean Cuthbertson, Instructor, Curriculum in Physical Therapy, Medical School, University of Michigan, Ann Arbor.

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Roxie Morris, Professor, Physical Therapy, University of Southern California.

Margaret S. Sandin, Instructor in the School of Nursing, Massachusetts General Hospital, Boston.

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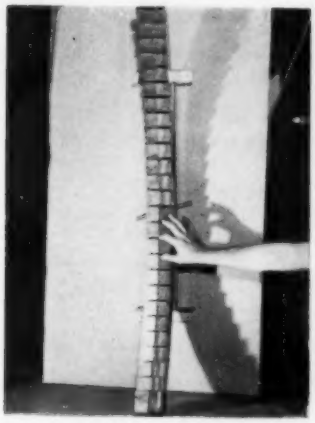
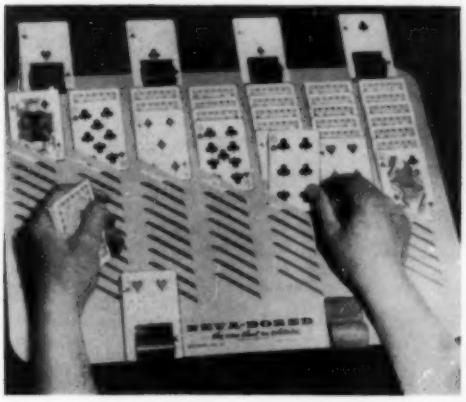


The Finger-Shoulder Ladder is a versatile adjunct to shoulder exercise. The arc center can be adjusted to any shoulder height, and the arc shape enables the arm to move in a normal pattern. It is made of laminated mahogany, with heavy gauge steel wall mounting, finished with decorative coppertone enamel. N & K Products.

121. Neva-Bored

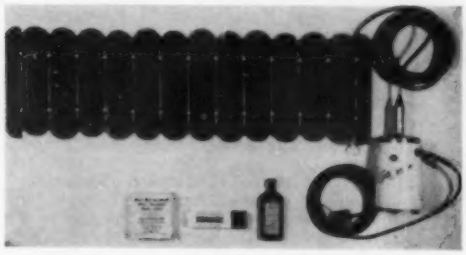


Neva-Bored is for convalescents from 9 to 90 who like card games. With Neva-Bored anyone can play solitaire in the comfort of his bed or easy chair. No table is needed. Neva-Bored holds cards firmly and neatly in place. Pleasant green color and lightweight. Neva-Bored Mfg. Co.

For more information on items write to The Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

New items which may be of interest to physical therapists will be mentioned in these pages each month. The accompanying explanations are made by the manufacturers and have not been investigated by the *Physical Therapy Review*.

122. Geysir Underwater Massage



Geysir Underwater Massage unit releases air bubbles from a plastic mat and provides an underwater massage effect. Designed for home treatment programs, the Geysir converts any bathtub into a complete body hydrotherapy unit. Geysir Diapool Baths Inc.

Index to Volume 39 of the Physical Therapy Review, 1959

Page numbers refer to the following issues:

January	1-64	July	445-508
February	65-128	August	509-572
March	129-200	September	573-652
April	201-280	October	653-708
May	281-360	November	709-772
June	361-444	December	773-860

Scientific articles, news items, and feature materials are listed by subject; book reviews are listed by author and subject. Scientific articles are in italics; book reviews are in quotation marks.

A

Adams, J.—"Outline of Fractures Including Joint Injuries," 565
Adams, R. (see Walton)
Adjustable Basketball Bankboard—Stevens, 94
Adjustable Shoulder Wheel—Sister M. Rosamond, 95
Administration
  Auxiliary Personnel in Medical Practice—Caughey, 81
  Integrated Staff Program Planning to Improve Care for the Child with Cerebral Palsy—Houtz and Blakeley, 284
  Physical Therapy Services in a Small Hospital—Beard 232
  Professional Income of Physical Therapists: A Sampling Study of Personnel Policies, 740
  Public Health Agency Solves the Problem of Written Prescriptions—Holmes, 90
  Safe Practices in the Physical Therapy Department—Rose, 669
"Adolescence, the Stormy Decade"—Mohr and Despres, 502
Advisory Committee on Chapter Activities, Report, 329
Advisory Committee to the Department of Professional Education, Report, 109
Aegerter—"Orthopedic Diseases: Physiology—Pathology—Radiology," 195
Agersnap, Mrs. Rudie, Elected President, WCPT, 821
Allan—"Rehabilitation: A Community Challenge," 123
Alvord (see Greenfield)
American Hospital Association
  .... APTA Institute Impressions—Sherrell, 254
  .... Institute (editorial)—Chabala, 236
  national hospital week, 321
AHA-APTA Institute Impressions—Sherrell, 254
American Hospital Association Institute (editorial)—Chabala, 236
American Hospital Association Institute for Physical Therapists, 324, 412, 502, 547, 617, 688
American Physical Therapy Association
  acting executive director appointed, 485
  advisory committee on chapter activities, report of fifth annual meeting, 329
  advisory committee to the department of professional education, 109
  annual reports, 621
  annual statistical reports, 548
  ....—OVR institute, 110
  association officers, standing and advisory committees, 170, 256, 458, 687, 726, 819
  board of directors and executive committee meetings—summary report, 257
  bylaw amendments, 181
  chapter directory, 274, 702
  charter member, Blanche Marvin, honored, 179
  conference—1959, 38, 102, 172, 244, 332, 414, 611, 747
  consultant in the department of professional education, Anne Pascasio, 833
  editorial board meets, 328
  election results—1959, 611
  elections—1960, 688
  films
    The Return, 98, 99
  house of delegates meeting, summary, 750
  institutes
    AHA-APTA .... impressions—Sherrell, 254
    ....-OVR, 110, 690
  judicial committee, 331
  life member, Ruby M. Tuft, honored, 829
  membership directory, 165, 277, 555
  nominating committee candidates, 259
  nominating committee, report of, 98
  nominations for directors, 180
  OVR .... graduate traineeships, 324, 491
  OVR rehabilitation grant received, 690
  president's address—Snyder, 618
  Professional Income of Physical Therapists: A Sampling Study of Personnel Policies, 740
  public health section—1958, 42
  public health section—1959, 177, 252, 388, 425, 753
  section on education, 250, 339, 425
  self employed section, 252, 338, 426
  statistical reports, 548
  volunteers in national office, 165
APTA-OVR Graduate Traineeships, 324, 491
APTA-OVR Institute, 110, 690
Amputee
  Pathological Dermographism in an ....—Hassard and McGlamery, 475
  Three Year Study of Lower Extremity .... at a Veterans Administration Center—Magato, 461
Anastasia (see Elliott)
Anatomy (see also Neuroanatomy)
  ".... and Physiology"—Rowe and Wheble, 842
  ".... and Physiology for Nurses"—Sears, 842
  ".... of the Nervous System"—Ranson and S. Clark, 767
  "Essentials of Human ...."—Woodburne, 646
  "Method of ...., Descriptive and Deductive"—Grant, 439
  "Synopsis of Regional ...."—Johnson, 122

"Textbook of Human...."—J. Boyd, W. Clark, Hamilton, Yoffey, Zuckerman, and Appleton, 60
"Anatomy and Physiology"—Rowe and Wheble, 842
"Anatomy and Physiology for Nurses"—Sears, 842
"Anatomy of the Nervous System"—Ranson and S. Clark, 767
Anderson, M. H.—"Functional Bracing of the Upper Extremities," 269
Anderson, W. A. D.—"Synopsis of Pathology," 123
"Annals of the New York Academy of Sciences, Vol. 69. Article I: Biological Applications of Infrared Spectroscopy"—St. Whitelock, Bauman, and C. Clark, 59
Annual Reports, 621
Annual Statistical Reports, 548
"Anomalies of Infants and Children"—Mayer and Swanker, 767
Apparatus
Adjustable Basketball Bankboard—Stevens, 94
Adjustable Shoulder Wheel—Sister M. Rosamond, 95
Bi-Level Homemade Bed Elevator—Volle, 407
Blocks for Balance and Posture for the Spastic Patient—R. Brown, 741
Brace-Locking Lever—E. B. Hill, 235
Crutch Attachment for Wheel Chairs—Webber, 320
Design and Measurement of Training Chairs for the Cerebral Palsied Child—Robertson, 538
Evaluation and Selection of Wheel Chairs—Fowles, 525
Flexible Trunk Harness for the Paraplegic—Brinn and Mohney, 600
"Functional Bracing of the Upper Extremities"—Anderson and Sollars, 269
Improvised Method for Sling Suspension Exercise—Lyford and Bonner, 530
Leg Treatment Table—Volle, 477
"Medical Electrical Equipment"—Molloy, 271
Neurotrophic Ulcers of the Foot: Corrective Shoes for Leprosy—Currier, 674
Patient Scheduling for the Large Therapy Department—Humphrey, 31
Rubber Urinal Adaptation for Incontinent Boys—Rohrer and Bartlett, 542
"Saran-Wrap" Used to Reduce Friction—Russell, 680
"Self-Help Devices for Rehabilitation"—New York University-Bellevue Medical Center, 123
Sling, the K-B Universal—Breuer and Kamper, 479
Standing Table with Adjustable Lap Board—M. Boyd and Mohney, 32
Stand-Up Chair for Cerebral Palsied Children—Bosworth, 319
Syphon Drinking Cup—M. Hill, 162
Table for Mechanically Resistive Exercise—Louie, 405
Teaching Device for the Ataxic Child—Geller, 818
Weighted Cuff—Weis, 604
Application of Client-Centered Counseling to Clinical Teaching—Gehman, 401
Arkansas Law Amended, 327
Armstrong—"Lumbar Disc Lesions: Pathogenesis and Treatment of Low Back Pain and Sciatica," 501
Army
former army physical therapists asked to contribute to history, 253, 321, 408
law extends retirement benefits to certain army nurse and AMSC officers, 745
reserve officers can earn credit at APTA conference, 174, 250, 343, 409; at OTA conference, 617
Arteriosclerosis
Role of the Physical Therapist in a Home Care Program—Littauer and Hickok, 217
Three Year Study of Lower Extremity Amputees at a Veterans Administration Center—Magato, 451
Arthritis
"Rheumatoid...."—Short, Bauer, and Reynolds, 765
Therapeutic Problems Encountered in the Management of Severe Rheumatoid....—Tall, 29
As Others See Us (editorial)—Snyder, 544
"An Atlas of Muscle Pathology in Neuromuscular Diseases"—Greenfield, Shy, Alvord, Berg, 195
Auxiliary Personnel in Medical Practice—Caughey, 81

B

Babbs—*Electrical Stimulation for Reduction of Girth: Study of a Single Case*, 92
Badoux (see Elliott)
Bartlett (see Rohrer)
Bauer (see Short)
Bauman (see St. Whitlock)
Beard, Gertrude, Laboratory Dedicated, 345
Beard—*Physical Therapy Services in a Small Hospital*, 232
Bellevue Medical Center—"Self-Help Devices for Rehabilitation," 123
Berg (see Greenfield)
Bi-Level Homemade Bed Elevator—Volle, 407
"Biological Applications of Infrared Spectroscopy, Annals of the New York Academy of Sciences, Vol. 69, Article I"—St. Whitelock, 59
Blair—1:6::1:3 (editorial), 744
Blair, Lucy, Appointed Acting Executive Director, 485
Blakeley
Case Report: Understanding Emotional Reactions to Disability, 21
Integrated Staff Program Planning to Improve Care for the Child with Cerebral Palsy, 299
Blocks for Balance and Posture for the Spastic Patient—R. Brown, 741
Board of Directors and Executive Committee Meetings, Summary Report, 257
Bonica—*The Management of Myofascial Pain Syndromes*, 389
Bonner (see Lyford)
Booklets Received, 272, 362
Bosworth—*Stand-Up Chair for Cerebral Palsied Children*, 319
Bowen (see Hemenway)
Boyd, J.—"Textbook of Human Anatomy," 60
Boyd, M.—*A Standing Table with Adjustable Lap Board*, 32
Boyd, W.—"Pathology for the Physician," 646
Boynton—*Observations on the Effects of Cool Baths for Patients with Multiple Sclerosis*, 297
Brace-Locking Lever—E. B. Hill, 235
Braces
"Functional Bracing of the Upper Extremities"—M. H. Anderson, 269
Brazier—"The Central Nervous System and Behavior," 565
"Breathing Exercises"—Storey, 270
Breuer—*The K-B Universal Sling*, 479
Brinn—*Flexible Trunk Harness for the Paraplegic*, 600
Brown, J. B.—"Skin Grafting," 500
Brown, K.—*One Method of Treating Subdeltoid Bursitis*, 678

Brown, R.—*Blocks for Balance and Posture for the Spastic Patient*, 741
Bruce—"Physiotherapy in Chest Diseases," 353
Brunner—*Methods of Heating the Hip Joint*, 738
Buca (see Boynton)
Buchanan (see Sexton)
Burns
Early Physical Therapy in Second Degree ....—Mahoney, 233
"Skin Grafting"—J. B. Brown and McDowell, 500
Bursitis
Pain Associated with Soft Tissue Syndromes—K. Brown, Hines, and Smith, 678
Bylaw Amendments, Proposed, 181

C

California
registration law amended, 485
state registration, 614
California Chapters Hold 1959 Convention, 104
Candidates for Nominating Committee, 259
Cannell (see Kahn)
Caughey—*Auxiliary Personnel in Medical Practice*, 81
"Central Nervous System and Behavior"—Brazier, 565
Cerebral Palsy
Design and Measurement of Training Chairs for the Cerebral Palsied Child—Robertson, 538
Evaluation of Equanil as Adjunct to Physical Therapy for Children with Severe ....—Gelperin and Payton, 383
"... in Childhood"—Woods, 355
Integrated Staff Program Planning to Improve Care for the Child with ....—Houtz and Blakeley, 284
"Primer of ..."—Russ and Soboloff, 565
Reflections About Reflex Therapy in ... (editorial)—Swinyard, 322
Stand-Up Chair for Cerebral Palsied Children—Bosworth, 319
United Cerebral Palsy Association awards grant for scholarship program, 757
"Cerebral Palsy in Childhood"—Woods, 355
Cerebral Vascular Accidents, Pain Associated with, Three Case Reports—Hofkosh, McFarren, Perdue, 733
Cervical Strain—Maul, 814
Chabala—American Hospital Association Institute (editorial), 236
Chao—"Convulsive Disorders of Children," 566
Chapter Directory, 274, 702
Charter Member Honored upon Retirement, 179
Cheraskin (see Langley)
Children
"Anomalies of Infants and ..."—Mayer and Swanker, 767
"Growth and Development of the Young Child"—Rand, Sweeney, and Vincent; revised by Breckenridge and Murphy, 124
Physical Therapy in the Treatment of Cystic Fibrosis—Doyle, 24
Chisholm—"Prescription for Survival," 271
Chogavadzya—*Successful Application of Medical Gymnastics in a Serious Trauma of the Spinal Column*. (Translated by Yoakum), 602
Chusid—"Correlative Neuroanatomy and Functional Neurology," 766
"Ciba Collection of Medical Illustrations: Nervous System"—F. Netter, 60
Clark, C. (see St. Whitelock)
Clark, S. (see Ranson)
"Cleft Palate and Speech"—Morley, 766
"Clinical Orthopaedics: Vol. 11. Orthopaedic Surgery in the Geriatric Patient"—De Palma, 842
"Clinical Orthopaedics: Vol. 12. Rehabilitation"—DePalma, 566
"Clinical Physiology of Physical Fitness and Rehabilitation"—Jokl, 438
Cohen (see Isaacs)
Cold
Observations on the Effects of Cool Baths for Patients with Multiple Sclerosis—Boynton, Garramone, and Buca, 297
Treatment of Spasticity by Exposure to ....—Viel, 598
Colorado bill passed, 485
Communication with Non-English Speaking Patients—Elliott, Badoux, and Anastasia, 595
Conference—1959, 38, 102, 172, 244, 332, 414, 611, 747
Confidential Information—Judicial Committee, 331
Connecticut Law Amended, 612
"Convulsive Disorders of Children"—Chao, Druckman, and Kellaway, 566
Cook (see Ripley)
"Correlative Neuroanatomy and Functional Neurology"—Chusid and McDonald, 766
Council of Physical Therapy School Directors, 46, 339, 639
Crutch Attachment for Wheel Chairs—Webber, 320
Current Trends and Practices in Physical Therapy—Kruse, 304
Currier—*Neurotrophic Ulcers of the Foot: Corrective Shoes for Leprosy*, 674
Cystic Fibrosis, Course on Treatment, 639
Cystic Fibrosis, Physical Therapy in the Treatment of—Doyle, 24

D

DePalma
"Clinical Orthopaedics: Vol. 11. Orthopaedic Surgery in the Geriatric Patient," 842
"Clinical Orthopaedics: Vol. 12. Rehabilitation," 566
Dermatomyositis
Physical Therapy for ... and Pulmonary Tuberculosis"—McIntire, 404
"Polymyositis"—Walton and R. Adams, 194
Dermatomyositis, Physical Therapy for, and Pulmonary Tuberculosis—McIntire, 404
Dermographism, Pathological, in an Amputee—Hassard and McGlamery, 475
Design and Measurement of Training Chairs for the Cerebral Palsied Child—Robertson, 538
Despres (see Mohr)
Devices (see Apparatus)
Diabetes Mellitus
Role of the Physical Therapist in a Home Care Program—Littauer and Hickok, 217
Three Year Study of Lower Extremity Amputees at a Veterans Administration Center—Magato, 461
Dickson (see Babbs)
Diet Therapy Handbook, 493
"Diseases of Bones and Joints: Tumors and Tumorous Conditions"—Jaffe, 355

Donahue—"New Frontiers of Aging," 124
Doyle—*Physical Therapy in the Treatment of Cystic Fibrosis*, 24
Druckman (see Chao)
Duccini—National Foundation Travelship to Italy 1954, 47
Duvall—"Kinesiology," 841
"Dynamics of Interviewing, Theory, Technique and Cases"—Kahn and Cannell, 195

E

Early Physical Therapy in Second Degree Burns—Mahoney, 233
Ebner (see Heardman)
Editorial Board Meets, 328
Editorials
American Hospital Association Institute—Chabala, 236
As Others See Us—Snyder, 544
Early Impressions—Wood, 96
Listening, a Vital Link—Friz, 410
1:6::1:3—Blair, 744
Physical Therapist—Physician Interrelationships—Voss, 482
Prologue to 1959—Voss, 34
Reflections About Reflex Therapy in Cerebral Palsy—Swinyard, 322
The Third Front—Williams, 164
Thoughts on Security—Voss, 682
World Confederation for Physical Therapy—Elson, 606
Education
advisory committee to the department of professional education, 109
APTA-OVR graduate traineeships, 324, 491
Application of Client-Centered Counseling to Clinical Teaching—Gehman, 401
army medical center holds conference, 261
Auxiliary Personnel in Medical Practice—Caughey, 81
Communication with Non-English Speaking Patients—Elliott, Badoux, and Anastasia, 595
consultant in the department of . . . ., Anne Pascasio, 833
council of physical therapy school directors, 463, 639
Current Trends and Practices in Physical Therapy—Kruse, 304
cystic fibrosis course, 639
fellowship honors Bell Greve, 640
Georgia Warm Springs course expanded, 639
graduate study committee meeting, 755
members elected to Pi Lambda Theta, 261
Physical Therapy . . . . .—A Responsibility of the Profession—Hirt, 756
pool therapy technic demonstrated, 640
scholarships
National Foundation, 44, 689, 755
OVR-APTA traineeships, 324, 755
United Cerebral Palsy grant, 757
Section on . . . . ., 250, 339, 425
staff change, 185
The National Foundation scholarship program, 44, 344, 492, 689
University of North Carolina, 690
Election Results—1959, 611
Elections—1960, 688
Electrical Stimulation for Reduction of Girth: Study of a Single Case—Babbs, Wood, Phillips, Dickson, 92
Electromyography
Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographical Study—Partridge and Walters, 791
Electrotherapy
"Manual of . . . ."—Watkins, 59
Elliott—*Communication with Non-English Speaking Patients*, 595
Elson
receives international society's award, 827
World Confederation for Physical Therapy (editorial), 606
"Epilepsy"—Sakel, 501
Epilepsy
"Convulsive Disorders of Children"—Chao, Druckman, and Kellaway, 566
Equipment (see Apparatus)
"Essentials of Clinical Neuroanatomy and Neurophysiology"—Manter, 647
"Essentials of Human Anatomy"—Woodburne, 646
Ethics
Safe Practices in the Physical Therapy Department—Rose, 669
Evaluation and Selection of Wheel Chairs—Fowles, 525
Evaluation of Equanil as Adjunct to Physical Therapy for Children with Severe Cerebral Palsy—Gelperin and Payton, 383
Evaluation of Motor Function in Hemiplegia—Michels, 589
Exercise
"Therapeutic . . . . "—Licht, 354
Exercises, Breathing
"Breathing Exercises"—Storey, 270
"Physiotherapy in Chest Diseases"—Bruce, Reuterswärd, and Westin, 353

F

Fibrositis
Management of Myofascial Pain Syndromes—Bonica, 389
Pain Associated with Soft Tissue Syndromes—K. Brown, Hines, and Smith, 678
. . . . *of the Left Shoulder*—Hines, 679
Films
. . . . of interest, listing, 557, 574, 677
. . . . shown at conference, 557, 574
libraries for *The Return*, 99
proprioceptive neuromuscular facilitation, 23, 95, 241, 488, 542, 599
The Return, 98
how to borrow a print, 303, 545
Fishbein—"Poliomyelitis Papers and Discussions Presented at the Fourth Poliomyelitis International Conference," 840
Flexible Trunk Harness for the Paraplegic—Brinn and Mohney, 600
Former Army Physical Therapists Asked to Contribute to Corps' History, 253, 321, 408
Fourth Inter-American Congress of Rehabilitation, 188, 243
Fowler—*Low Back Pain*, 803
Fowles—*Evaluation and Selection of Wheel Chairs*, 525
"Fractures and Dislocations"—Perkins, 500
French
Communication with Non-English Speaking Patients—Elliott, Badoux, and Anastasia, 595
Friz—Listening, a Vital Link (editorial), 410
"From Witchcraft to World Health"—Leff and Leff, 194

Frostbite
Ultrasonic Therapy—Severe . . . . Case —MacNamarra, 160
"Functional Bracing of the Upper Extremities"—M. Anderson and Sollars, 269
Furlong, R.—"Injuries of the Hand," 61

G

Garramone (see Boynton)
Gast (see Isaacs)
Gehman—*Application of Client-Centered Counseling to Clinical Teaching*, 401
Geller—*A Teaching Device for the Ataxic Child*, 818
Gelperin—*Evaluation of Equanil as Adjunct to Physical Therapy for Children with Severe Cerebral Palsy*, 383
Georgia Warm Springs Expands Program, 639
Geriatrics
"Clinical Orthopaedics: Vol. 11. Orthopaedic Surgery in the Geriatric Patient"—DePalma, 842
"New Frontiers of Aging"—Donahue and Tibbitts, 124
Gertrude Beard Laboratory Dedicated, 345
Graduate Study Committee Meeting, 755
Graduate Traineeships, OVR-APTA, 324, 755
Grant—"A Method of Anatomy, Descriptive and Deductive," 439
Greenfield—"An Atlas of Muscle Pathology in Neuromuscular Diseases," 195
Greulich—"Radiographic Atlas of Skeletal Development of the Hand and Wrist," 700
Greve, Bell, Memorial Fellowship, 640
"Growth and Development of the Young Child"—Rand, Sweeney and Vincent, 124
Gynaecology
"Physiotherapy in Obstetrics and ...."—Heardman, 647

H

Hassard—*Pathological Dermographism in an Amputee*, 475
Health
"From Witchcraft to World Health"—Leff and Leff, 194
Heardman—"Physiotherapy in Obstetrics and Gynaecology," 647
Hemenway—*Physical Therapy in Surgical Treatment of Pulmonary Tuberculosis*, 396
Hemiplegia
Evaluation of Motor Function in . . . . .—Michels, 589
Pain Associated with Cerebral Vascular Accidents Three Case Reports—Hofkosh, McFarren, Perdue, 733
Treatment of Spasticity by Exposure to Cold—Viel, 598
Hickok (see Littauer)
Hill E. B.—*Brace-Locking Lever*, 235
Hill, M.—*Syphon Drinking Cup*, 162
Hines—*Fibrositis of the Left Shoulder*, 678
Hirt—Physical Therapy Education—A Responsibility of the Profession, 756
History
"From Witchcraft to World Health"—Leff and Leff, 194
Hodgkins Disease
Paralysis of the Trapezius Muscle—Moore, 535
Hofkosh—*Pain Associated with Cerebral Vascular Accidents*, 733
Hollender—"Psychology of Medical Practice," 440
Hollis—"Suspension Therapy in Rehabilitation," 841
Holmes—*A Public Health Agency Solves the Problem of Written Prescriptions*, 90
Home Care
Role of the Physical Therapist in a . . . . Program—Littauer and Hickok, 217
Horsh—*Legal Aspects of Physical Therapy in the Hospital*, 226
House of Delegates, Summary of 1959 Meeting, 750
Houtz—*Integrated Staff Program Planning to Improve Care for the Child with Cerebral Palsy*, 299
How to Arrange to Borrow a Print of *The Return*, 303, 403, 545, 732
"How to Relax and Have Your Baby"—Jacobson, 701
Humphrey—*Patient Scheduling for the Large Therapy Department*, 31
Hysterical Paralysis, Diagnosed as Poliomyelitis—Rogoff and Chrystal, 331

I

Improvised Method for Sling Suspension Exercise—Lyford and Bonner, 530
"Injuries of the Hand"—R. Furlong, 61
Injuries, Whiplash, of the Neck, Physical Therapy Program for—Jampol, 312
Institute of Physical Medicine and Rehabilitation—"Self-Help Devices for Rehabilitation," 123
Integrated Staff Program to Improve Care for the Child with Cerebral Palsy—Houtz and Blakeley, 299
International Society for Welfare of Cripples
Bell Greve Memorial Fellowship, 640
Mildred Elson receives award, 827
Interviewing
"Dynamics of .....,Theory, Technique, and Cases"—Kahn and Cannell, 195
Isaacs—*Responses to Physical Therapy under a Hallucinogen*, 27
Italian
Communication with Non-English Speaking Patients —Elliott, Badoux, and Anastasia, 595

J

Jacobson—"How to Relax and Have Your Baby," 701
Jaffee—"Diseases of Bones and Joints: Tumors and Tumorous Conditions," 355
Jampol—*The Physical Therapy Program for Whiplash Injuries of the Neck*, 312
Johnson—"Synopsis of Regional Anatomy," 122
Jokl—"Clinical Physiology of Physical Fitness and Rehabilitation," 438
Judicial Committee—Confidential Information, 331

K

Kahn—"Dynamics of Interviewing, Theory, Technique and Cases," 195
Kamper (see Breuer)

K-B Universal Sling—Breuer and Kamper, 479
Kellaway (see Chao)
Kenny Foundation Fellowships for Physicians, 637
"Kinesiology"—Duvall, 841
Kirkpatrick (see Aegerter)
Klein, Helen Hickey, Accepts New Position, 833
Kolb, M. E., Demonstrates Pool Therapy, 640
Kruse—*Current Trends and Practices in Physical Therapy*, 304
Kumpuris—*Postoperative Herniated Nucleus Pulposus*, 804

L

Lamm, S.—"Pediatric Neurology," 700
Langley, L.—"Physiology of Man," 353
Latin-American Rehabilitation Conference, 188
Law
Legal Aspects of Physical Therapy in the Hospital—Horsh, 226
Lee, Lt. Col. Harriet, Honored, 547
Leff—"From Witchcraft to World Health," 194
Legal Aspects of Physical Therapy in the Hospital—Horsh, 226
Legislation
Arkansas law amended, 327
California registration law amended, 485
Colorado bill passed, 485
Connecticut law amended, 612
Nevada law amended, 327
New York education law, 485
North Dakota bill passed, 486
Ohio licensure law, 613
Oregon bill passed, 486, 546
Utah bill passed, 327
state examining committees meet, 613
state registration in California, 614
Leg Treatment Table—Volle, 477
Lehmann (see Brunner)
Leonard (see Sexton)
Leprosy
Neurotrophic Ulcers of the Foot: Corrective Shoes for . . . . Currier, 674
Letters to the Editor, 489, 615, 750
Licht— "Therapeutic Exercise," 354
Life Saving Method for Adults, Red Cross, 681
Lindquist, Jeanne, Memorial, 165
Ling—"Rehabilitation after Illness and Accident," 440
Listening, a Vital Link (editorial)—Friz, 410
Littauer—*Role of the Physical Therapist in the Home Care Program*, 217
"Long-Term Illness: Management of the Chronically Ill Patient"—Wohl, 701
Louie—*A Table for Mechanically Resistive Exercise*, 405
Low Back Pain—Fowler, 803
Low Back Pain and Sciatica—Moe, 800
"Lumbar Disc Lesions: Pathogenesis and Treatment of Low Back Pain and Sciatica"—Armstrong, 501
Lyford—*An Improvised Method for Sling Suspension Exercise*, 530

M

McDonald (see Chusid)
McDowell (see J. B. Brown)
McFarlane (see Hofkosh)
McGlamery (see Hassard)
McIntire—*Physical Therapy for Dermatomyositis and Pulmonary Tuberculosis*, 404
McMillan (see Brunner)
MacNamarra—*Ultrasonic Therapy—Severe Frostbite Case*, 160
Magato—*Three Year Study of Lower Extremity Amputees at a Veterans Administration Center*, 461
Mahoney—*Early Physical Therapy in Second Degree Burns*, 233
Malignancies
Role of the Physical Therapist in a Home Care Program—Littauer and Hickok, 217
Management of Myofascial Pain Syndromes—Bonica, 389
Manter—"Essentials of Clinical Neuroanatomy and Neurophysiology," 647
"Manual of Electrotherapy"—Watkins, 59
Margerum (see Isaacs)
Martin—*Sprains, Strains, and Whiplash Injuries*, 808
Marvin, Blanche, Honored, 179
Maul—*Cervical Strain*, 814
Mayer—"Anomalies of Infants and Children," 767
"Medical Electrical Equipment"—Molloy, 271
Medical Galvanism in the Treatment of Acute Myositis—Smith, 679
"Medicina Física y Rehabilitacíon"—Tohen Zamudio, 270
Medicine
"Psychology of Medical Practice"—Hollender, 440
Membership Directory, 165, 277, 555
"Method of Anatomy, Descriptive and Deductive"—Grant, 439
Methods of Heating the Hip Joint—Brunner, McMillan, and Lehmann, 738
Michels—*Evaluation of Motor Function in Hemiplegia*, 589
Minnesota, Physical Therapy Week, 337, 418
Moe—*Low Back Pain and Sciatica*, 800
Mohney
Flexible Trunk Harness for the Paraplegic, 600
Standing Table with Adjustable Lap Board, 32
Mohr—"The Stormy Decade: Adolescense," 502
Molloy—"Medical Electrical Equipment," 271
Moore—*Paralysis of the Trapezius Muscle*, 535
Morley—"Cleft Palate and Speech," 766
Morrissey—*Whiplash Injury*, 815
Motor Function, Evaluation of, in Hemiplegia—Michels, 589
Mouse Called Funnyfoot, 691
Multiple Sclerosis
Observations of the Effects of Cool Baths for Patients with . . . . .—Boynton, Garramone, and Buca, 297
Treatment of Spasticity by Exposure to Cold—Viel, 598
Mundale (see Ripley)
Muscular Dystrophy
mouse called funnyfoot, 691
"Myasthenia Gravis"—Osserman, 701
Myositis
Management of Myofascial Pain Syndromes—Bonica, 389
Pain Associated with Soft Tissue Syndromes—K. Brown, Hines, and Smith, 678

N

National Foundation
health scholarship state selection committees, 344, 492
scholarship program, 44, 689, 755
National Foundation Travelship to Italy—Duccini, 47

Navy
assistant appointed for women's specialist section officers, 409
recruits physical therapists, 487, 543
Netter, F.—"Ciba Collection of Medical Illustrations: Nervous System," 60
Neuroanatomy
"Correlative . . . . . and Functional Neurology"—Chusid and McDonald, 766
"Essentials of Clinical . . . . . and Neurophysiology"—Manter, 647
Neurology
"An Atlas of Muscle Pathology in Neuromuscular Diseases"—Greenfield, Shy, Alvord, and Berg, 194
"Ciba Collection of Medical Illustrations: Nervous System"—Netter, 60
"Correlative Neuroanatomy and . . . . . "—Chusid and McDonald, 766
"Pediatric . . . . . "—Lamm, 700
Neurophysiology
"Central Nervous System and Behaviour"—Brazier, 565
"Essentials of Clinical Neuroanatomy and . . . . . "—Manter, 647
Neurosurgical Consideration of Pain—French, 729
Neurotrophic Ulcers of the Foot: Corrective Shoes for Leprosy—Currier, 674
Nevada Law Amended, 327
"New Frontiers of Aging"—Donahue and Tibbetts, 124
New York Education Law, 485
New York University—Bellevue Medical Center—"Self-Help Devices for Rehabilitation," 123
Noland—*Physical Therapy for the Meniscectomy*, 85
Nominating Committee Candidates, 259
Nominating Committee Report, 98
Nominations for Directors, 180
North Dakota Bill Passed, 486
Northwestern University Laboratory Dedicated, 345

O

Observations on the Effects of Cool Baths for Patients with Multiple Sclerosis—Boynton, Garramone, and Buca, 297
Obstetrics
"How to Relax and Have Your Baby"—Jacobson, 701
"Physiotherapy in . . . . . and Gynaecology"—Heardman, 647
Office of Vocational Rehabilitation
APTA . . . . . institute, 110, 690
graduate study committee meeting, 755
. . . . . APTA graduate traineeships, 324, 491
rehabilitation grant, 690
Ohio Licensure Law, 613
O'Malley (see Ling)
Oregon Bill Passed, 486, 546
Orlava—*Therapeutic Physical Culture in the Complex Treatment of Pneumonia*, 153
"*Orthopedic Diseases:* Physiology—Pathology—Radiology"—Aegerter and Kirkpatrick, 195
Orthopedics
"Clinical . . . . . : Vol. 11. Orthopaedic Surgery in the Geriatric Patient"—DePalma, 842
"Clinical . . . . .: Vol. 12. Rehabilitation"—DePalma, 566
"Diseases of Bones and Joints: Tumors and Tumorous Conditions"—Jaffe, 355
"Fractures and Dislocations"—Perkins, 500
Orthopedics (continued)
"Injuries of the Hand"—Furlong, 61
Low Back Pain and Sciatica—Moe, 800
"Lumbar Disc Lesions: Pathogenesis and Treatment of Low Back Pain and Sciatica"—Armstrong, 501
"Orthopedic Diseases: Physiology, Pathology, and Radiology"—Aegerter and Kirkpatrick, 195
"Outline of Fractures Including Joint Injuries"—J. Adams, 565
Pain, Low Back, and Sciatica—Moe, 800
Case Histories
Low Back Pain—Fowler, 803
Recurrent Back Pain: Emotional and Physical Aspects—Sexton, Leonard and Buchanan, 806
Postoperative Herniated Nucleus Pulposus—Kumpuris, 804
Physical Therapy for the Meniscectomy—Noland and Way, 85
Physical Therapy Program for Whiplash Injuries of the Neck—Jampol, 312
"Radiographic Atlas of Skeletal Development of the Hand and Wrist"—Greulich, 700
Sprains, Strains, and Whiplash Injuries—Martin, 808, Case Histories
Cervical Strain—Maul, 814
Whiplash Injury—Morrissey, 815
Radiculitis—Pascasio, 817
Osserman—"Myasthenia Gravis," 701
"Outline of Fractures Including Joint Injuries"—J. Adams, 565
OVR-APTA Graduate Traineeships, 324

P

Pain Associated with Cerebral Vascular Accidents; Case Histories—Hofkosh, McFarren, Perdue, 733
Pain Associated with Soft Tissue Syndromes; Case Histories—K. Brown, Hines, and Smith, 678
Pain, Low Back, and Sciatica—Moe, 800; Case Histories
Low Back Pain—Fowler, 803
Postoperative Herniated Nucleus Pulposus—Kumpuris, 804
Recurrent Back Pain: Emotional and Physical Aspects—Sexton, Leonard, and Buchanan, 806
Pain, Neurosurgical Consideration of—French, 729
Paralysis of the Trapezius Muscle—Moore, 535
Paraplegia
Flexible Trunk Harness for the Paraplegic—Brinn and Mohney, 600
Successful Application of Medical Gymnastics in a Serious Trauma of the Spinal Column. (Translated by Yoakum)—Chogavadzya, 602
Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographic Study—Partridge and Walters, 791
Partridge—*Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographic Study*, 791
Pascasio
consultant in department of professional education, 833
Radiculitis, 817
Pathological Dermographism in an Amputee—Hassard and McGlamery, 475
Pathology
"An Atlas of Muscle . . . . in Neuromuscular Diseases"—Greenfield, Shy, Alvord, and Berg, 194

". . . . for the Physician"—W. Boyd, 646
"Synopsis of . . . ."—W. Anderson, 123
"Pathology for the Physician"—W. Boyd, 646
Patient Scheduling for the Large Therapy Department—Humphrey, 31
Payton (see Gelperin)
"Pediatric Neurology"—Lamm, 700
Pediatrics
"Growth and Development of the Young Child"—Rand, Sweeney and Vincent; revised by Breckenridge, 124
"Pediatric Neurology"—Lamm, 700
"The Stormy Decade: Adolescence"—Mohr, 502
Perdue (see Hofkosh)
Peripheral Vascular Diseases (see also Circulation)
"Vascular Surgery"—de Takats, 646
Perkins—"Fractures and Dislocations," 500
Phillips (see Babbs)
Physical Therapist—Physician Interrelationships (editorial)—Voss, 482
Physical Therapy Education—A Responsibility of the Profession—Hirt, 756
Physical Therapy for Dermatomyositis and Pulmonary Tuberculosis—McIntire, 404
Physical Therapy for Patient with Cervical Cord Trauma—Swanson, 317
Physical Therapy for the Meniscectomy—Noland and Way, 85
Physical Therapy in Surgical Treatment of Pulmonary Tuberculosis—Hemenway and Bowen, 396
Physical Therapy in the Treatment of Cystic Fibrosis—Doyle, 24
Physical Therapy Practice Acts 1913-1959, 550
Physical Therapy Program for Whiplash Injuries of the Neck—Jampol, 312
Physical Therapy Seminar at University of North Carolina, 754
Physical Therapy Services in a Small Hospital—Beard, 232
Physical Therapy Week in Minnesota, 337, 418
Physiology (see also Neurophysiology)
"Anatomy and . . . ."—Rowe and Wheble, 842
"Anatomy and . . . . for Nurses"—Sears, 842
"Clinical . . . . of Physical Fitness and Rehabilitation"—Jokl, 438
". . . . . of man"—Langley and Cheraskin, 353
"Physiology of Man"—Langley and Cheraskin, 353
"Physiotherapy in Chest Diseases"—Bruce, Reutersward, and Westin, 353
"Physiotherapy in Obstetrics and Gynaecology"—Heardman, 647
Plastic Surgery
"Skin Grafting"—J. B. Brown and McDowell, 500
Pneumonia
Therapeutic Physical Culture in the Complex Treatment of . . . . (Translated by Yoakum) Orlava, 153
"Poliomyelitis Papers and Discussions Presented at the Fourth International Poliomyelitis Conference"—Fishbein (editor), 840
"Poliomyositis"—Walton and R. Adams, 194
Pool Therapy Technic Demonstrated, 640
Postoperative Herniated Nucleus Pulposus—Kumpuris, 804
"Prescription for Survival"—Chisholm, 271
President's Address—Snyder, 618
"Primer of Cerebral Palsy"—Russ and Soboloff, 565
Professional Income of Physical Therapists: A Sampling Study of Personnel Policies, 740
Professional Liability
Legal Aspects of Physical Therapy in a Hospital—Horsh, 226
Professional Test, 255
Prologue to 1959 (editorial)—Voss, 34
Proposed Bylaw Amendments, 181
Proprioceptive Neuromuscular Facilitation film, 23, 95, 241, 488, 542, 599
Psychology
"Adolescense: The Stormy Decade"—Mohr and Despres, 502
Application of Client-Centered Counseling to Clinical Teaching—Gehman, 401
"Dynamics of Interviewing, Theory, Technique, and Cases"—Kahn and Cannell, 195
" . . . of Medical Practice"—Hollender, 440
Understanding Emotional Reactions to Disability—Ripley, 13
"Psychology of Medical Practice"—Hollender, 440
Publications
handbook on diet therapy, 493
Public Health Agency Solves the Problem of Written Prescriptions—Holmes, 90
Public Health Section—1959, 177, 252, 388, 425, 753
Public Health Section Summary of Minutes—1958, 42
Puerto Rico and International Society
Rehabilitation Conference, 188
Puerto Rico chapter participates, 243
Pyle (see Greulich)

Q

Quadriplegia
Treatment of Spasticity by Exposure to Cold—Viel, 598
Physical Therapy for Patient with Cervical Cord Trauma—Swanson, 317

R

Radiculitis—Pascasio, 817
"Radiographic Atlas of Skeletal Development of the Hand and Wrist"—Greulich and Pyle, 700
Rand—"Growth and Development of the Young Child," 124
Ranson—"The Anatomy of the Nervous System," 767
Recurrent Back Pain: Emotional and Physical Aspects—Sexton, Leonard and Buchanan, 806
Red Cross Adopts "Mouth-to-Mouth" Lifesaving Method for Adults, 681
Reflections About Reflex Therapy in Cerebral Palsy (editorial)—Swinyard, 322
Rehabilitation
"Clinical Orthopaedics: Vol. 12: . . . ."—DePalma, 566
"Clinical Physiology of Physical Fitness and . . . ."—Jokl, 438
"Long-Term Illness: Management of the Chronically Ill Patient"—Wohl, 701
Medicina Física y Rehabilitación"—Tohen Zamudio, 270
OVR . . . . grant to APTA for institute, 690
"Physiotherapy in Chest Diseases"—Bruce, Reutersward, and Westin, 353
". . . . A Community Challenge"—Allan, 122
". . . . after Illness and Accident"—Ling and O'Malley, 440
". . . . Medicine"—Rusk, 269

Role of the Physical Therapist in a Home Care Program—Littauer and Hickok, 217
"Self-Help Devices for . . . ."—New York University-Bellevue Medical Center, Institute of Physical Medicine and Rehabilitation, 123
Successful Application of Medical Gymnastics in a Series Trauma of the Spinal Column. (Translated by Yoakum)—Chogavadzya, 602
"Suspension Therapy in . . . ."—Hollis and Roper, 841
Three Year Study of Lower Extremity Amputees at a Veterans Administration Center—Magato, 461
Understanding Emotional Reactions to Disability—Ripley, 13
"Rehabilitation: A Community Challenge"—Allan, 123
"Rehabilitation after Illness and Accident"—Ling and O'Malley, 440
"Rehabilitation Conference for Latin-American Countries, 188
"Rehabilitation Medicine"—Rusk, 269
Research
"Annals of the New York Academy of Sciences, Vol. 69, Article 1: Biological Applications of Infrared Spectroscopy"—St. Whitelock, Bauman, C. Clark, 59
Current Trends and Practices in Physical Therapy—Kruse, 304
Electrical Stimulation for Reduction of Girth—Babbs, E. Wood, Phillips, and Dickson, 92
Evaluation of Equanil as Adjunct to Physical Therapy for Children with Severe Cerebral Palsy—Gelperin and Payton, 383
Methods of Heating the Hip Joint—Brunner, McMillan, Lehmann, 738
Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographic Study— Partridge and Walters, 791
Responses to Physical Therapy under a Hallucinogen—Isaacs, Margerum, Gast and Cohen, 27
Strength Variation Through the Range of Joint Motion—Williams and Stutzman, 145
Three Year Study of Lower Extremity Amputees at a Veterans Administration Center—Magato, 461
Research Group Meeting, 340
Reserve Officers of the Army Can Earn Credits at APTA conference, 174, 250, 343, 409
OTA conference, 617
Responses to Physical Therapy under a Hallucinogen—Isaacs, Margerum, Gast, and Cohen, 27
Retirement Benefits for Army Nurse and Army Medical Specialist Corp Officers, 745
Return, The
film libraries where available, 99
how to borrow a print, 303, 545, 732
named in top 10 films in Times, 98
Reutersward (see Bruce)
Review Board Meeting, 328
Review Went to Paris, 753
Reynolds (see Short)
Rheumatism, Muscular
Management of Myofascial Pain Syndromes—Bonica, 389
"Rheumatoid Arthritis"—Short, Bauer, and Reynolds, 765
Ripley—*Understanding Emotional Reactions to Disability*, 13
Robertson—*Design and Measurement of Training Chairs for the Cerebral Palsied Child*, 538
Rohrer—*Rubber Urinal Adaptation for Incontinent Boys*, 542
Role of the Physical Therapist in a Home Care Program—Littauer and Hickok, 217
Roper, (see Hollis)
Rose— *Safe Practices in the Physical Therapy Department*, 669
Rowe—"Anatomy and Physiology," 842
Rubber Urinal Adaptation for Incontinent Boys—Rohrer and Bartlett, 542
Rusk—"Rehabilitation Medicine," 269
Russ—"A Primer of Cerebral Palsy," 565
Russell—*"Saran Wrap" Used to Reduce Friction*, 680

S

Safe Practices in the Physical Therapy Department—Rose, 669
Safety
Legal Aspects of Physical Therapy in the Hospital—Horsh, 226
St. Whitelock—"Annals of the New York Academy of Sciences, Vol. 69, Article I: Biological Applications of Infrared Spectroscopy," 59
Sakel—"Epilepsy," 501
"Saran-Wrap" Used to Reduce Friction—Russell, 680
Sargent College, 345
Scholarship Programs
National Foundation, 44, 689, 755
United Cerebral Palsy, 757
Schools
council of physical therapy school directors, 46
Sargent College, 345
University of North Carolina, 690, 754
Schools Offering Courses in Physical Therapy, 53, 114, 189, 262, 347, 432, 494, 558, 641, 694, 759, 834
Sears—"Anatomy and Physiology for Nurses," 842
Section on Education, 250, 339, 425
Self Employed Section, 252, 338, 426, 753
"Self-Help Devices for Rehabilitation"—New York University—Bellevue Medical Center, Institute of Physical Medicine and Rehabilitation, 123
Sexton—*Recurrent Back Pain: Emotional and Physical Aspects*, 806
Shaw (see Ripley)
Sherrell—AHA-APTA Institute Impressions, 254
Short—"Rheumatoid Arthritis," 765
Short Term Courses
above-knee prosthetics, 8, 111, 490, 556, 638, 693, 758, 832
advanced course in physical rehabilitation methods, 8, 111, 186, 260
below-knee prosthetics, 490, 556, 638, 693, 758, 832
cerebral palsy, 8, 111, 186, 260, 344, 431, 490, 556, 638, 693, 758, 832
cerebral palsy, postgraduate courses, 490, 556, 638, 693
cystic fibrosis, 758
functional bracing of the upper extremities, 8, 111, 186, 260, 431, 490, 556, 638, 693, 758, 832
lower extremity prosthetics, 638, 693, 758, 832
neurophysiological bases for rehabilitation, 8, 833
physical medicine and rehabilitation in surgical conditions, 186, 260
physical preparation for childbirth, 186, 260
physical therapist's role in the treatment of the geriatric patient, 8, 111, 833
physical therapy in the care of neuromuscular diseases, 8, 111, 186, 260, 344, 431, 490, 556, 638, 693, 758, 832
principles and practice of geriatric rehabilitation, 111, 186, 260, 833

technics of neuromuscular reeducation, 8, 111, 186, 260, 344, 431, 490, 556, 638, 693, 758, 832
technics of treatment, postgraduate course, 8, 111, 186, 260, 344, 431, 490, 556, 638
treatment for the cerebral palsied, 833
upper extremities prosthetics, 8, 111, 186, 260, 344, 490, 556, 638, 693, 758, 832
Shy (see Greenfield)
Sister M. Rosamond—*Adjustable Shoulder Wheel*, 95
"Skin Grafting"—J. B. Brown and McDowell, 500
Sling, The K-B Universal—Breuer and Kamper, 479
Smith—*Medical Galvanism in the Treatment of Acute Myositis*, 679
Snyder
As Others See Us (editorial), 544
president's address, 618
Soboloff (see Russ)
Sollars (see M. H. Anderson)
Spanish
Communication with Non-English Speaking Patients—Elliott, Badoux, and Anastasia, 595
Spasticity
Treatment of .... by Exposure to Cold—Viel, 598
Speech
"Cleft Palate and ..."—Morley, 766
Sprains, Strains, and Whiplash Injuries—Martin, 808; Case Histories
Cervical Strain—Maul, 814
Whiplash Injury—Morrissey, 815
Radiculitis—Pascasio, 817
Standing Table with Adjustable Lap Board—M. Boyd and Mohney, 32
Stand-Up Chair for Cerebral Palsied Children—Bosworth, 319
State Board Examinations—1959, 50, 76, 140, 210, 294, 376, 454, 518, 584, 664, 720, 788
State Examining Committees Meet, 613
Statistical Reports, National Office, APTA, 548
Stevens—*An Adjustable Basketball Bankboard*, 94
Storey—"Breathing Exercises," 270
"Stormy Decade: Adolescence"—Mohr and Despres, 502
Strength Variation Through the Range of Joint Motion—Williams and Stutzman, 145
Student Column, 112, 185, 261, 345, 430, 492, 557
Stutzman (see Williams)
Subdeltoid Bursitis, One Method of Treating—K. Brown, 678
Successful Application of Medical Gymnastics in a Serious Trauma of the Spinal Column. (Translated by Yoakum)—Chogavadzya, 602
Surgery (see also Orthopedics)
"Clinical Orthopaedics: Vol. 11. Orthopaedic .... in the Geriatric Patients"—DePalma, 842
"Skin Grafting"—J. B. Brown and McDowell, 500
"Vascular ...."—de Takats, 646
"Suspension Therapy in Rehabilitation"—Hollis and Roper, 841
Swanker (see Mayer)
Swanson—*Physical Therapy for Patient with Cervical Cord Trauma*, 317
Sweeney (see Rand)
Swinyard—Reflections About Reflex Therapy in Cerebral Palsy (editorial), 322
"Synopsis of Pathology"—W. A. D. Anderson, 123
"Synopsis of Regional Anatomy"—Johnson, 122
Syphon Drinking Cup—M. Hill, 162

T

Table for Mechanically Resistive Exercise—Louie, 405
Takats, de—"Vascular Surgery," 646
Tall—*Therapeutic Problems Encountered in the Management of Severe Rheumatoid Arthritis*, 29
Teaching Device for the Ataxic Child—Geller, 818
Testing of Motor Abilities—Vaughn, 88
Tests and Measurements
Evaluation and Selection of Wheel Chairs—Fowles, 525
Evaluation of Motor Function in Hemiplegia—Michels, 589
Participation of the Abdominal Muscles in Various Movements of the Trunk in Man: An Electromyographic Study—Partridge and Walters, 791
Strength Variation Through the Range of Joint Motion—Williams and Stutzman, 145
Testing of Motor Abilities—Vaughn, 88
Variations in Current Manual Muscle Testing—Wintz, 466
"Textbook of Human Anatomy"—J. Boyd, W. Clark, Hamilton, Yoffey, Zuckerman, and Appleton, 60
"Therapeutic Exercise"—Licht, 354
Therapeutic Physical Culture in the Complex Treatment of Pneumonia. (Translated by Yoakum), Orlava, 153
Therapeutic Problems Encountered in the Management of Severe Rheumatoid Arthritis—Tall, 29
The Return
film libraries where available, 99
how to borrow a print, 303, 545, 732
named in top 10 films, 98
The Third Front (editorial)—Williams, 164
Third Congress Impressions, 821
Thoughts on Security (editorial)—Voss, 682
Three Year Study of Lower Extremity Amputees at a Veterans Administration Center—Magato, 461
Tibbetts (see Donahue)
Treatment of Spasticity by Exposure to Cold—Viel, 598
Tuberculosis, Pulmonary
Physical Therapy for Dermatomyositis and ....—McIntire, 404
Physical Therapy in Surgical Treatment of ....—Hemenway and Bowen, 396
Tuft, Ruby M., Honored, 829

U

Ultrasonic Therapy—Severe Frostbite Case—MacNamarra, 160
Ultrasound
Methods of Heating the Hip Joint—Brunner, McMillan, Lehmann, 738
Understanding Emotional Reactions to Disability—Ripley; Case Histories—Mundale, Cook, Blakeley and Shaw, 13
United Cerebral Palsy Awards Grant for Scholarship Program, 757
University of North Carolina, 690, 754
Utah Bill Passed, 327

V

Variations in Current Manual Muscle Testing—Wintz, 466
"Vascular Surgery"—de Takats, 646

Vaughn—*Testing of Motor Abilities*, 88
Viel—*Treatment of Spasticity by Exposure to Cold*, 598
Vincent (see Rand)
Volle
Bi-Level Homemade Bed Elevator, 407
Leg Treatment Table, 477
Voss
Physical Therapist-Physician Interrelationships, 482
Prologue to 1959, 34
Thoughts on Security, 682

W

Walters (see Partridge)
Walton—"Polymyositis," 194
Watkins—"A Manual of Electrotherapy," 59
Way (see Noland)
Webber—*Crutch Attachment for Wheel Chairs*, 320
Weighted Cuff—Weis, 604
Weis—*Weighted Cuff*, 604
Westin (see Bruce)
Wheble (see Rowe)
Wheel Chairs, Evaluation and Selection—Fowles, 525
Whiplash Injuries of the Neck, Physical Therapy Program for—Jampol, 312
Whiplash Injuries, Sprains, Strains—Martin, 808
Whiplash Injury—Morrissey, 815
White House Conference on Children and Youth, 686
Williams
The Third Front (editorial), 164
Strength Variation Through the Range of Joint Motion, 145
Wintz—*Variations in Current Manual Muscle Testing*, 466
Wohl—"Long-Term Illness: Management of the Chronically Ill Patient," 701
Wood, E. (see Babbs)
Woodburne—"Essentials of Human Anatomy," 646
Woods, G.—"Cerebral Palsy in Childhood," 355
World Confederation for Physical Therapy
bulletin, 166
editorial—Elson, 606
president's message to member-organizations, 167
third congress, 36, 106, 168, 238, 325, 429, 488, 555, 609, 821
third congress impressions, 821
third president elected, 821

Y

Yoakum
Successful Application of Medical Gymnastics in a Serious Trauma of the Spinal Column, 602
Therapeutic Physical Culture in The Complex Treatment of Pneumonia, 153

Z

Zamudio—"Medicina Física y Rehabilitacíon," 270

Positions Available

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WANTED IMMEDIATELY: One qualified field staff physical therapist for home-bound service in a generalized voluntary public health nursing agency to work under qualified physical therapy supervision. Salary range $4104-$4968 dependent upon experience; 37½ hr., 5-day wk; 8 holidays; 22 working days vacation; 15 working days sick leave. Apply Supervisor, Physical Therapy Department, Visiting Nurse Society of Philadelphia, 1340 Lombard Street, Philadelphia 47, Pennsylvania.

Openings for THREE STAFF THERAPISTS before January 1960. Male or female. Rapidly expanding rehabilitation center. Beginning salaries $4325 to $4775 depending on experience with annual increments. Both inpatient and outpatient services with complete rehabilitation personnel. Write Bernard J. Michela, M.D., Director, Rehabilitation Institute of Chicago, 401 East Ohio Street, Chicago 11, Illinois.

PHYSICAL THERAPY CONSULTANT: Help develop a new state geriatrics consultation service to local health authorities and nursing home administrators. Assist in training institutes. Demonstrate physical therapy techniques. Need B.S. in physical therapy and four years' experience including two in specialized work with elderly, handicapped people. Start at $563. Wisconsin State Board of Health, State Office Bldg., Madison.

STAFF PHYSICAL THERAPIST for well equipped department. New graduate accepted. Varied treatment program. Apply Patricia C. Heitt, RPT, Ventura Physical Therapy, 151 N. Brent, Ventura, California.

STAFF PHYSICAL THERAPIST for 400-bed private general hospital with large active volume outpatient department. Liberal salary range and employee benefits. May be experienced or recent graduate—licensed in Wisconsin or eligible to take license examination. Excellent working conditions in one of midwest's foremost institutions. Centrally located in city and convenient to outstanding residential and shopping facilities. Contact Personnel Director, Milwaukee Hospital, 2200 W. Kilbourn Ave., Milwaukee 3, Wisconsin.

ASSISTANT DIRECTOR OF PHYSICAL THERAPY needed by March 1, for an attractive and completely equipped department. Female preferred with at least three years experience. New general hospital, 375 beds, air-conditioned, and in residential area. Department is utilized by all services, has summer student clinical training program, excellent personnel policies, friendly atmosphere. Salary range $4706-$5577. Refer replies to: Mrs. Ruth J. Jones, Director of Physical Therapy, Richmond Memorial Hospital, Richmond 27, Virginia.

STAFF PHYSICAL THERAPISTS: needed for Iowa Methodist Hospital's newly opened 120-bed Younker Memorial Rehabilitation Center. Excellent chance for advancement. Competent supervision, professional staff and assistants. Both in- and outpatient work. Salary range $365-$420; 40-hour week, vacations, sick leave, holidays, insurance, other benefits. Inquire Personnel Department, Iowa Methodist Hospital, Des Moines, Iowa.

(continued on next page)

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Positions Available

PHYSICAL THERAPIST: Experienced. Wanted for active, well equipped department in a 154-bed hospital with expansion program under way. Pleasant surroundings in north suburb of Chicago. Modern housing. Recreational facilities and cultural activities available. Good salary, 40-hour week, varied cases treated. Contact Personnel Director, Highland Park Hospital, Highland Park, Illinois.

WANTED: Qualified physical therapist for expanding outpatient Rehabilitation Center, treating both adults and children. Forty-hour, five-day week. Contact Clinton Owens, Rehabilitation Center, 316 Longwood Drive, S.W., Huntsville, Alabama.

PHYSICAL THERAPISTS (Cerebral Palsy Program) $415-505 month. Requires graduation from recognized program, California registration, plus 1 year of P. T. experience. A progressive program in a modern expanding Health Department. Mr. I. Schnayer, Alameda County, 188 12 Street, Oakland, California.

STAFF OPENING: Work with orthopedic conditions in private clinic separated from physicians' offices. Treatments closely coordinated with referring physicians. Salary open. WRITE: Director, The Physical Therapy Center, 2220 J Street, Sacramento 16, California.

OPPORTUNITY: Rapidly-growing and progressively equipped P.T. department, serving a 535-bed General Hospital which itself serves a 200 mile radius. Tremendous opportunity for growth—very good additional benefits—salary is competitive depending on experience. Immediate opening. Please write Personnel Director, Sacred Heart Hospital, W. 101—8th Avenue, Spokane, Washington.

WANTED: Physical Therapist, preferably male, to operate and manage complete physiotherapeutic center associated with private orthopedic practice. Salary open. 1026 Washington Trust Building, Washington, Pennsylvania. BAldwin 5-3870.

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IMMEDIATE opening. Well-equipped Physical Medicine Department. Large general hospital. Varied case load. All age levels. General Medical and Orthopedic disabilities. Location Midwest. Staff of four Therapists. Salary open. Address replies to Box 93, care of the Physical Therapy Review, 1790 Broadway, New York 19, New York.

REGISTERED PHYSICAL THERAPIST for medium size general hospital in Saginaw, Mich. Staff position, salary open, 40 hr.-wk., liberal vacation policy and sick leave. Active Physical Medicine Program. Address replies to Box 52 care of the Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

Opening for QUALIFIED STAFF PHYSICAL THERAPIST (female) in fully approved 60-bed orthopedic hospital, predominantly crippled children. Minimum of two years experience required. Vacation with pay, sick leave, insurance benefits. Starting salary $4800, maximum $6300. Apply Administrator, Marmet Hospital, Marmet, West Virginia.

PHYSICAL THERAPIST for outpatient Rehabilitation Center directed by physiatrist. Wide variety of treatment program. Coordinated physical, occupational, speech-hearing, psychological, vocational and social services. Excellent personnel policies and working conditions. Contact R. A. Silvanik, Administrator, The Rehabilitation Center of Summit County, Inc., 326 Locust Street Akron 2, Ohio.

REHABILITATION and general medical hospital desires services of additional Physical Therapists, male or female. Near New Haven Hospital, close to Hartford and Waterbury. Fully equipped air-conditioned Physical Therapy Department. Policies and consultation by Dr. Thomas F. Hines, Physiatrist-in-Chief, Yale University, Department of Physical Medicine. Physical Therapist In Charge, Miss Charlotte E. Kinney, B.S., R.P.T. Salary open. Personal interview requested. Address Chief Physical Therapist, Box 440, Wallingford, Conn.

Detroit Memorial Hospital, fully accredited, 345 beds with large Physical Medicine Dept. under direction of a physiatrist, has an opening for STAFF REGISTERED PHYSICAL THERAPIST, male or female. For details please write Personnel Director, 1420 St. Antoine, Detroit 26, Michigan.

Qualified physical therapist for expanding 220-bed hospital with well equipped department; 40 hour week, paid vacation, sick leave and holidays; salary open. Apply Administrator, Portsmouth General Hospital, Portsmouth, Va.

IMMEDIATE PLACEMENT for qualified physical therapist, male or female, for Rehabilitation Center serving both in- and outpatients. Full time medical direction of a physiatrist. Excellent salary range, vacation, sick leave, and social security benefits. Apply Administrator, Rehabilitation Center, Inc., 340 East Madison Street, Louisville 2, Kentucky.

STAFF PHYSICAL THERAPIST: Well established department handling adult cases in a 604-bed general private nonprofit hospital. Department under orthopedic staff supervision. Salary open; 40-hour week; noon meal and laundry furnished; two weeks' paid vacation and sick leave; Blue Cross and Blue Shield plan available. Write Phillip B. Donley, Chief P.T., Akron City Hospital, Akron, Ohio.

QUALIFIED PHYSICAL THERAPIST (two) for outpatient cerebral palsy treatment center. Starting salary $4550 per year. Two months vacation, liberal sick leave benefits. Liberal personnel policy. Contact Robert Schlitt, Director, Peninsula Cerebral Palsy Training Center, 901-24th Street, Newport News, Virginia.

Positions Available

STAFF physical therapist: Salary open, 40-hour week, two weeks' vacation with pay, holidays, sick leave, Blue Cross, social security, industrial insurance. Private Practice Board Physiatrist; fully equipped modern offices; regular salary increments at six months and one year and thereafter on merit. For further details write William J. LaJoie, M.D., 2021 North Central Avenue, Phoenix, Arizona.

STAFF PHYSICAL THERAPIST for Cerebral Palsy School-Clinic, of Atlanta, Inc. Day School program, clinic and outpatient services for 100 children ranging in age from 18 months to 18 years. Five-day work week, public school holidays, two weeks' summer vacation, sick leave, salary open. Send qualifications and work summary to: Mrs. Harold M. Seymour, Administrator, the Cerebral Palsy School-Clinic of Atlanta, 1815 Ponce de Leon Avenue, N.E., Atlanta 7, Georgia.

STAFF PHYSICAL THERAPISTS for progressive rehabilitation program in expanding Chronic Disease Hospitals in Baltimore and Hagerstown, Maryland. Starting salary $4,040.00 with annual increments, vacation and sick leave. New and well equipped clinics. Montebello used as teaching hospital for medical students, nurses and physical therapists. Inexpensive living quarters available. Apply Dr. Florence Mahoney, Director Rehabilitation Medicine, or Miss Dorothea Barthel, Supervising Physical Therapist, Montebello Hospital, 2201 Argonne Drive, Baltimore 18, Md.

QUALIFIED physical therapist for rehabilitation of children with orthopedic and neurological conditions. Wide variety of patients. Good starting salary with merit increases. Five-day week. Annual two week paid vacation. Eleven paid holidays. Sick leave. Excellent retirement plan. Continuous interdisciplinary teaching program. Write: Linda Wessel, Director of Physical Therapy, Illinois Children's Hospital-School, 2551 North Clark Street, Chicago 14, Illinois.

PHYSICAL THERAPIST: Orthopedic Clinic staffed by three orthopedic surgeons, in one of Chicago's beautiful North Shore suburbs. Interested only in top notch, experienced individual. Salary open. Ravinia Orthopedic Clinic, 695 Roger Williams Ave., Highland Park, Illinois.

WANTED: Physical Therapist for staff position in Rehabilitation Center. Liberal benefits, air conditioned clinic, modern equipment and under direction of a physiatrist. Recent graduate acceptable. Write to Gottsche Rehabilitation Center, Box 790, Thermopolis, Wyoming.

PHYSICAL THERAPIST—FEMALE: Immediate opening in 160-bed general hospital in famous vacation area. Well established department. Write Mr. Richard Don-Tigny, St. Francis Hospital, Colo. Spgs., Colo.

WANTED: A trained physical therapist to organize a new department 300-bed hospital. Salary open depending on experience. Address: Hospital Administrator, St. Anthony Hospital, Terre Haute, Indiana.

PHYSICAL THERAPIST with at least one year experience to join staff of growing rehabilitation center. Patients include various types of handicaps. Excellent supervision and working situation, with Orthopedic Surgeons and other medical specialties. Beginning salary, $4,200 to $4,800 per annum. Contact Robert L. West, R.P.T., Easter Seal Therapy Center, Tallahassee, Florida.

STAFF PHYSICAL THERAPIST: State Crippled Children's Program, P. T. Clinics held in various health departments. Merit System status, retirement benefits, liberal vacation and sick leave. Salary range $4512-5640. Travel expenses paid. Responsible, challenging and secure position. Write: Director of Personnel, State Health Department, Richmond, Virginia.

WANTED: Physical therapist for staff position in outpatient rehabilitation clinic. Liberal benefits, air-conditioned clinic, modern equipment and under direction of a physiatrist. Recent graduate acceptable. Write to Ward A. Merrell, Administrator, Rehabilitation Services, Inc., 204 Court Street, Binghamton, New York.

Immediate opening for STAFF PHYSICAL THERAPIST in Southern California working primarily with orthopedic patients. Salary commensurate with experience and ability. Applicant must be eligible for registration in California. Apply to Lloyd B. Hanson, 128 South Grape Street, Escondido, California. Sherwood 53541.

STAFF PHYSICAL THERAPIST to work in an Outpatient Rehabilitation Center. Present plans are being drawn up for a Comprehensive Rehabilitation Center. Liberal fringe benefits and good starting salary. Contact Gerrit H. Wiegerink, Executive Director, Armen S. Kurkjian Rehabilitation Center, 941-43 Wealthy Street, S.E. Grand Rapids, Michigan, or call collect GL 6-9567.

STAFF PHYSICAL THERAPIST: for outpatient rehabilitation center treating both children and adults. Experience preferred but not essential. Starting salary, without experience, $4200. Forty hour, five-day week. Excellent personnel policies. Contact: Benedict R. Kraus, Chief P.T., Community Rehabilitation Clinic, 614 Dartmouth, S.W., Canton, Ohio.

WANTED: Qualified female physical therapist for well equipped department in a modern 350-bed general hospital. General hospital rehabilitation with all the specialties included. Paid vacation, sick leave, six holidays, salary open. Apply L. E. Thompson, Personnel Director, St. Rita's Hospital, Lima, Ohio.

Registered PHYSICAL THERAPIST for full time work in Visiting Nurse Association rehabilitation program. Requires experienced person with mature judgment. Variety of cases, cooperative relationship with medical centers, teaching program in patients' homes. Five-day, 40-hour week, 4 weeks' vacation, sick leave, holidays. Salary dependent on qualifications. Community offers excellent cultural and educational opportunities. Apply: Miss Janet Price, Assistant Director, The Visiting Nurse Association, 3300 Chester Avenue, Cleveland 14, Ohio.

Positions Available

AGENCY needs qualified physical therapist to work with children and adolescents; 40-hour week, 21 day sick leave, month paid vacation. Salary related to experience. Detroit Orthopaedic Clinic, an outpatient clinic. Write: Miss M. Genevieve Blakeley, Director, 5447 Woodward Avenue, Detroit 2, Michigan.

OPPORTUNITY: Rapidly-growing P. T. department in 500-bed general hospital offers wide range of experience and chance to progress. Liberal benefits, 40-hour week, $400 monthly starting salary for female registered physical therapist. Apply Physical Therapy Dept., Methodist Hospital, Memphis 4, Tenn.

STAFF THERAPIST for position in 575-bed JCAH accredited general hospital; 40-hour week. No week ends. Excellent salary and personnel policies. Furnished apartment at very reasonable rent. Write Personnel Director, St. Luke's Hospital, Duluth 11, Minnesota.

GRADUATES OF APPROVED SCHOOLS FOR PHYSICAL THERAPISTS, *new legislation provides that you may now practice under professional supervision in this State pending registration with the California Board of Medical Examiners.* Positions open in State Hospitals, the Veterans Home and special schools for handicapped children. Starting salaries $436.00 and up; liberal employee benefits; promotional opportunities. Streamlined civil service examinations twice a month in San Francisco and Los Angeles, and on request in other states near candidate's residence. Write State Personnel Board, 801 Capitol Avenue, P.T. 71, Sacramento 14, California.

WANTED: REGISTERED STAFF physical therapist for 385-bed general medical & surgical, and teaching hospital located in an industrial town surrounded by beautiful mountains and a number of TVA dams. Good personnel policies; 40 hrs. per wk. etc. Salary open. Write Executive Director; Holston Valley Community Hospital, Kingsport, Tennessee.

WANTED: DIRECTOR Rehabilitation Center to coordinate screening and treatment center; $5,500-$6,500 annually. Also conduct social investigation of patients and act as Executive Director, C.C.S. Address replies to Box 25 care of the Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

PHYSICAL THERAPIST: Immediate placement in staff position. Large general hospital offering variety of experience in treatment of inpatients and outpatients; 40-hour week. Attractive beginning salary. Apply to: Sister Carmella, Administrator, St. Mary's Hospital, Saginaw, Michigan.

PHYSICAL THERAPIST, Female, experienced or inexperienced. Salary up to $5200, depending on experience. Good personnel policies, 37½ hour work week. No Saturday or Sunday duty. Vacation, sick leave, Blue Cross and Blue Shield, automatic salary increases. Crossroads is located in a beautiful new building, well equipped. It is a rapidly growing comprehensive Rehabilitation Center. Write Roy E. Patton, Executive Director, 3242 Sutherland Avenue, Indianapolis 5, Indiana, or call collect WAlnut 6-2481.

WANTED: R. P. T., minimum experience two years, to take charge of new department in 250-bed general hospital; $500.00 month, plus 2 weeks' paid vacation, paid holidays, and sick leave. One hour from Pacific Ocean, 45 minutes from mountains and winter sports, 1 hour from Palm Springs, and 1½ hours from Los Angeles. For complete information contact Sister Cyril, St. Bernardine's Hospital, San Bernardino, Calif.

CHIEF PHYSICAL THERAPIST—Opening will be created in the near future by retirement of present Chief. General hospital recently expanded to 503 adult beds. Unusual opportunity for growth in P.T. services. Salary open—liberal merit plan for raises. Write Robert H. Brandow, Aultman Hospital, Canton 10, Ohio.

REGISTERED EXPERIENCED therapist for 230-bed general hospital, to work alone under supervision of certified physiatrists; good salary, increments, paid vacation, sick leave, 40-hour week; work in heart of Colonial Phila., birthplace of America and American Medicine. Address replies to Box 17 care of the Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

WANTED: Physical Therapist with formal training completed to assist in setting up and supervising physical therapy department in Goodwill Industries facility. Also, to work part-time in hospital setting. Beginning wage, $5,200. Experience preferred. Contact Goodwill Industries, 601 Cherry Street, Toledo 4, Ohio.

TWO STAFF THERAPISTS: for department which is a division of the Rehabilitation Service in a general hospital located in a large mid-Western city. Salary commensurate with experience. Department is well equipped and the case load is quite varied. Both inpatients and outpatients; 40-hour work week with usual vacation and sick leave policies. Clinical conferences are held regularly with other members of the division including Nursing Service, Medical Social Service, Occupational Therapy, etc. In addition to salary, employees receive a noon meal while on duty and laundry of own uniforms. For further information write Dr. Harry L. Acker, Medical Director, Rehabilitation Service, Deaconess Hospital, 6150 Oakland Avenue, St. Louis 10, Missouri.

STAFF PHYSICAL THERAPIST: Registered for 360-bed general short term hospital. Well equipped physical therapy department. Good salary; liberal personnel policies. Write Personnel Department, Madison General Hospital, 925 Mound Street, Madison, Wisconsin.

Qualified Physical Therapist, immediately. General 250-bed hospital has NEW DEPARTMENT under construction. Hospital and outpatient cases. Starting salary $4,500, two week vacation, sick leave, retirement plus other fringe benefits. Contact Chief Physical Therapist, Cecile Freese, Theda Clark Memorial Hospital, Neenah, Wisconsin.

PHYSICAL THERAPIST wanted for immediate placement in 300-bed general hospital; 40-hour week, sick leave, paid vacations and good salary. Apply to Miss Ella Mosimann, Sherman Hospital, Elgin, Illinois.

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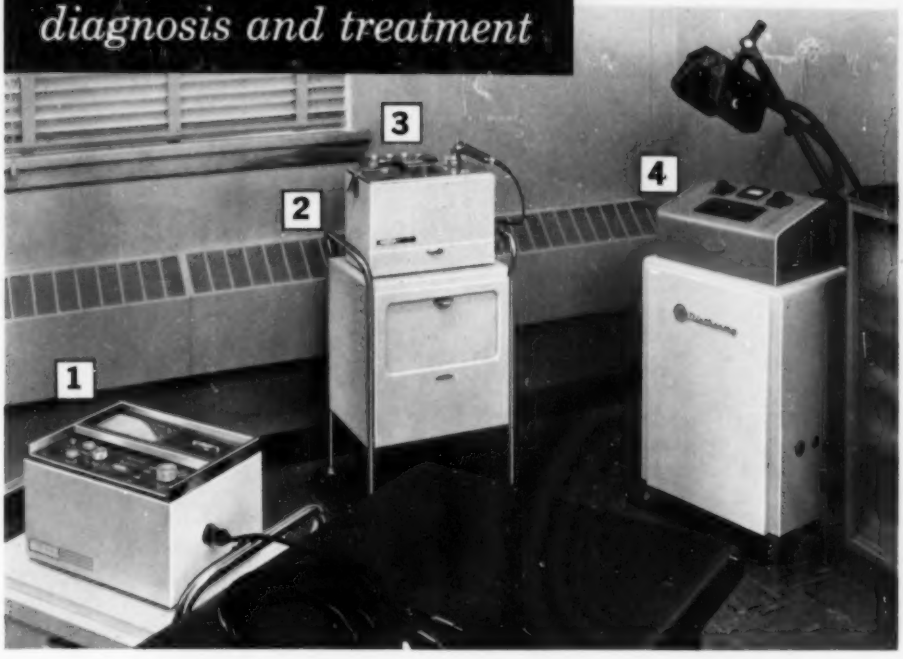

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